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THE ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS FOR 1877.

140 ENGRAVINGS.

ALBANY, N.Y.
Luther Tucker & Son.
No. 23

LOSSING-BARRITT.

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THE

ILLUSTRATED ANNUAL

REGISTER OF RURAL AFFAIRS

AND

CULTIVATOR ALMANAC

FOR THE YEAR 1877,

CONTAINING

PRACTICAL SUGGESTIONS FOR THE FARMER AND HORTICULTURIST.

With over 140 Engravings.

BY J. J. THOMAS,

AUTHOR OF THE 'AMERICAN FRUIT CULTURIST,' AND 'FARM IMPLEMENTS;'
ASSOCIATE EDITOR OF THE 'CULTIVATOR & COUNTRY GENTLEMAN.'

ALBANY, N. Y.:
LUTHER TUCKER & SON, 395 Broadway.
1877.

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PUBLISHERS' ADVERTISEMENT.

THE ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS has now reached its twenty-third year, under the continuous Editorial charge of Mr. JOHN J. THOMAS, to whose thorough practical knowledge of the various topics it has embraced, with assistance from other accomplished writers on special subjects, its readers have been indebted for the most comprehensive and concise series of papers in the different branches of Rural Economy, within the whole range of our agricultural literature. The profuse illustrations from the pencil of the Editor, by which they are accompanied, give special attractiveness and value to the work, for which most of them were especially drawn and engraved; and the reading matter is wholly from the manuscript of the authors, and original, except to the limited extent in which it is expressly stated to be a condensation from the writings of others. Its success as the first of such Annuals before the American public, led to numerous imitations, all of which, however, have long since been discontinued. The present number will constitute the second in an Eighth Triennial Volume, and will be found fully as popular and useful, it is believed, as any of its predecessors. Brief reference is made, under the head of "Agricultural Memoranda," to the leading events of the past year—the books published, deaths recorded, chief importations of improved stock, leading public sales, &c., and the "Farmer's Register," at the end, furnishes a directory, unique of its kind, which, although not purporting to be complete, embraces all those leading establishments which are represented within a recent period in the advertising columns of the COUNTRY GENTLEMAN.

Designed to supply, in connection with the Calendar pages of an Almanac, an ANNUAL of Agriculture and Horticulture, THE REGISTER OF RURAL AFFAIRS incidentally illustrates from year to year, the progress made in these important Arts, but is especially intended to compress within a small compass the largest possible amount of information for the farmer and fruit-grower, and indeed on all points connected with the out-door or in-door labors of those whose homes are in the Country. While the previous numbers will consequently be found to contain more or less on every branch of practical cultivation, they are also especially rich in Designs for Farm and Country Houses and Working Men's Cottages,—on Ornamental Planting, and the care of Gardens and Grounds,—and on related topics, such as architecture generally, fences and gates, vegetable physiology, entomology, farm and horticultural implements, the care of domestic animals, hints for housekeepers, underdraining, butter and cheese making, poultry and bee-keeping, &c., &c.—thus constituting in fact a LIBRARY in themselves.

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INDEX OF No. 23, FOR 1877.

ILLUSTRATIONS.

THE

CULTIVATOR ALMANAC

FOR 1877.

ASTRONOMICAL CALCULATIONS IN EQUAL OR CLOCK TIME.

ECLIPSES FOR THE YEAR 1877.

THERE WILL BE FIVE ECLIPSES this year, as follow :

I. A Total Eclipse of the Moon, February 27. Invisible in America.

II. A Partial Eclipse of the Sun, March 14. Invisible in America.

III. A Partial Eclipse of the Sun, August 8. Invisible in America.

IV. A Total Eclipse of. the Moon, August 23. Partly visible in the United States, as follows :

PLACE.	Begins.	Middle.	Ends.	PLACE.	Begins.	Middle.	Ends.
	H. M.	H. M.	H. M.		H. M.	H. M	H. M.
Boston, ...	4 35 ev.	6 26 ev.	8 16 ev.	Buffalo,. ...	4 4 ev.	5 55 ev.	7 45 ev.
New-York, .	4 23 ev.	6 14 ev.	8 4 ev.	Charleston,..	3 59 ev.	5 50 ev.	7 40 ev.
Philadelphia	4 19 ev.	6 10 ev.	8 0 ev.	Chicago,....	3 29 ev.	5 20 ev.	7 10 ev.
Washington,	4 11 ev.	6 2 ev.	7 52 ev.	St. Louis....	3 18 ev.	5 9 ev.	6 59 ev.

V. A Partial Eclipse of the Sun, September 6. Invisible in North America.

THE FOUR SEASONS.

			D.	H.	M.		D.	H.	M.
Winter begins,	1876,	December	21,	5	46	mo., and lasts	89	1	18
Spring do.	1877,	March	20,	7	4	mo., do.	92	20	6
Summer do.	1877,	June	21,	3	10	mo., do.	93	2	30
Autumn do.	1877,	September	22,	5	48	eve., do.	90	6	2
Winter do.	1877,	December	21,	11	42	mo. Trop.year,	365	5	36

CYCLES OF TIME AND CHURCH DAYS.

Septuagesima Sunday,	Jan. 28	Easter Sunday,...	April 1	Dominical Letter,.....	G
Sexigesima do.	Feb. 4	Low do ...	April 8	Epact, ...	15
Quinquagesima do.	Feb. 11	Rogation do. ...	May 6	Golden Number, ...	16
Ash Wednesday,.....	Feb. 14	Ascension Day,..	May 10	Solar Cycle, ...	10
Quadragesima Sunday	Feb. 18	Whit Sunday,....	May 20	Roman Indiction,.....	5
Mid-Lent, ...	Mar. 11	Trinity do ...	May 27	Julian Period,..	6590
Palm Sunday,.....	Mar. 25	Corpus Christi,...	May 31	Dionysian Period,.. ...	2c6
Good Friday, ...	Mar. 30	Advent Sunday,..	Dec. 2	Jewish Lunar Cycle,...	13

MORNING AND EVENING STARS.

DEFINITION.—The planet Venus is called a Morning Star when she rises before the Sun, and an Evening Star when she sets after the Sun. The planets Mars, Jupiter and Saturn may be considered Morning and Evening Stars when they rise shortly before the Sun, or set shortly after the Sun, in the same manner as Venus does. But hey may also be considered as Evening Stars when they rise before 12 o'clock at night, and as Morning Stars when they are visible before sunrise, until the day when they set on or before sunrise.

MORNING STARS.—Venus until May 6. Mars until June 6. (Mars is also visible before sunrise until about Sept. 5, after which date he sets before sunrise earlier every day.) Jupiter until April 13. (Jupiter is also visible before sunrise until about June 22, after which date he sets before sunrise earlier every day.) Saturn from March 1 to June 16. (Saturn is also visible before sunrise until about the middle of September, when he sets before sunrise earlier every day.)

EVENING STARS.—Venus after May 6. Mars after June 6, rising after that date before midnight. Jupiter after April 13, rising before midnight. Saturn until March 1, and also after June 16, at which date he begins to rise before midnight.

APPARENT AND MEAN TIME.

Time is both *apparent* and *mean*. The Sun is on the meridian at 12 o'clock on four days only in the year. It is sometimes as much as 16¼ minutes before or after twelve when the shadow strikes the noon mark on the sun-dial. This is occasioned by the irregular motion of the earth on its axis, and the inclination of its poles. This is called *apparent time*. *Mean time* is determined by the *equation* of these irregularities for every day in the year, and is noted in all good almanacs. The latter is the true or correct time.

TO ASCERTAIN THE LENGTH OF DAY AND NIGHT.—At any time in the year, add 12 hours to the time of the Sun's setting, and from the sum subtract the time of rising, for the *length of the day*. Subtract the time of setting from 12 hours, and to the remainder add the time of rising the next morning, for the *length of the night*. This rule is true of either apparent or mean time.

THE TRANSIT OF VENUS.—It will probably be a year or two yet before the results of the Transit of 1874 will be made public. There is an immense mass of material to be worked up, and operations are so delicate that they cannot be hurried. Only with great consideration and at expense of much labor, can the final result be reached.

1st MONTH. **JANUARY, 1877.** 31 DAYS.

MOON'S PHASES.	D.	Boston. H. M.	New-York. H. M.	Washingt'n H. M.	Sun on Merid. D.	H.	M.	S.
Third Quarter,	6	9 33 mo.	9 21 mo.	9 9 mo.	1	12	4	6
New Moon, . . .	14	8 44 mo.	8 32 mo.	8 20 mo.	9	12	7	38
First Quarter,	22	11 9 mo.	10 57 mo.	10 45 mo.	17	12	10	35
Full Moon, . . .	29	3 55 mo.	3 43 mo.	3 31 mo.	25	12	12	45

Day of Month.	Day of Week.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		Sun Rises	Sun Sets.	Moon Rises.	H. W. Bost'n	Sun Rises	Sun Sets.	Moon Rises.	H. W. N. Y.	Sun Rises	Sun Sets.	Moon Rises.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	M	7 30	4 38	6 57	ev. 55	7 25	4 44	7 1	9 41	7 19	4 49	7 6
2	T	7 30	4 40	8 18	1 44	7 25	4 45	8 21	10 30	7 19	4 50	8 24
3	W	7 30	4 40	9 35	2 31	7 25	4 45	9 38	11 17	7 19	4 51	9 39
4	T	7 30	4 41	10 49	3 16	7 25	4 46	10 49	ev. 3	7 19	4 52	10 49
5	F	7 30	4 42	morn.	4 2	7 25	4 47	morn.	0 49	7 19	4 52	11 57
6	S	7 30	4 43	0 8	4 51	7 25	4 48	0 6	1 38	7 19	4 53	morn.
7	G	7 30	4 44	1 9	5 44	7 25	4 49	1 6	2 30	7 19	4 54	1 3
8	M	7 29	4 45	2 18	6 40	7 24	4 50	2 14	3 27	7 19	4 55	2 10
9	T	7 29	4 46	3 27	7 40	7 24	4 51	3 22	4 26	7 19	4 56	3 15
10	W	7 29	4 47	4 34	8 38	7 24	4 52	4 27	5 25	7 19	4 57	4 20
11	T	7 29	4 48	5 36	9 36	7 24	4 53	5 28	6 22	7 19	4 58	5 21
12	F	7 28	4 49	6 30	10 31	7 23	4 54	6 22	7 17	7 18	4 59	6 15
13	S	7 28	4 51	7 16	11 20	7 23	4 55	7 9	8 6	7 18	5 0	7 1
14	G	7 28	4 52	sets.	morn.	7 23	4 56	sets.	8 48	7 18	5 1	sets.
15	M	7 27	4 53	5 58	0 1	7 22	4 58	6 3	9 25	7 17	5 3	6 7
16	T	7 27	4 54	7 1	0 39	7 22	4 59	7 4	9 57	7 17	5 4	7 8
17	W	7 26	4 55	8 4	1 10	7 21	5 0	8 6	10 32	7 17	5 5	8 10
18	T	7 26	4 56	9 7	1 46	7 21	5 1	9 7	11 8	7 16	5 5	9 7
19	F	7 25	4 58	10 9	2 22	7 20	5 2	10 8	11 44	7 16	5 7	10 8
20	S	7 24	4 59	11 14	2 58	7 20	5 3	11 11	morn.	7 15	5 8	11 10
21	G	7 24	5 0	morn.	3 38	7 19	5 4	morn.	0 22	7 15	5 9	morn.
22	M	7 23	5 1	0 21	4 19	7 18	5 6	0 18	1 6	7 14	5 10	0 15
23	T	7 22	5 3	1 31	5 10	7 18	5 7	1 27	1 56	7 13	5 11	1 22
24	W	7 21	5 4	2 47	6 14	7 17	5 8	2 41	3 1	7 13	5 12	2 34
25	T	7 20	5 5	4 2	7 23	7 16	5 9	3 55	4 10	7 12	5 14	3 48
26	F	7 19	5 7	5 14	8 35	7 15	5 11	5 6	5 22	7 11	5 15	4 59
27	S	7 19	5 8	6 15	9 47	7 15	5 12	6 7	6 34	7 11	5 16	6 0
28	G	7 18	5 9	rises.	10 45	7 14	5 13	rises.	7 42	7 10	5 17	rises.
29	M	7 17	5 10	5 46	11 53	7 13	5 14	5 50	8 39	7 9	5 18	5 54
30	T	7 16	5 12	7 8	ev. 37	7 12	5 16	7 11	9 24	7 8	5 19	7 13
31	W	7 15	5 13	8 27	1 18	7 10	5 17	8 28	10 4	7 7	5 21	8 29

AGRICULTURAL MEMORANDA—*Oct.* 1, 1875, *to Oct.* 1, 1876, *with reference to date of* THE COUNTRY GENTLEMAN, *containing particulars*:

Albany Seed Store purchased by Price & Knickerbocker. Feb. 17, 1876.
Alexander, A J., Spring Station, Ky. Sale of Horses. July 6, 1876.
American Berkshire Record. Vol. One. By A. M. Garland, Springfield, Ill. June 29, 1876.
American Dairying. By L. B. Arnold. Rochester: Rural Publishing Co. Aug. 31, 1876.
American Dairymen's Association Meeting at Rome, N. Y. Jan. 20, 1876.
Am. Pomological Society. Report of 15th Session. Cambridge: T. P. James. May 11, '76.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
THIRD QUARTER,	5	0 16 mo.	0 4 mo.	11 52 4th	1	12 13 57
NEW MOON, . . .	13	4 15 mo.	4 3 mo.	3 51 mo.	9	12 14 30
FIRST QUARTER,	20	11 32 ev.	11 20 ev.	11 8 ev.	17	12 14 14
FULL MOON, . . .	27	2 30 ev.	2 18 ev.	2 6 ev.	25	12 13 13

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	T	7 14	5 14	9 40	2 8	7 10	5 18	9 39	10 48	7 6	5 22	9 39
2	F	7 13	5 16	10 54	2 44	7 9	5 19	10 51	11 30	7 6	5 23	10 50
3	S	7 11	5 17	morn.	3 29	7 8	5 21	morn.	ev. 15	7 4	5 24	morn.
4	**G**	7 10	5 19	0 6	4 16	7 7	5 22	0 2	1 2	7 3	5 25	0 1
5	M	7 9	5 20	1 16	5 9	7 6	5 23	1 10	1 55	7 2	5 26	1 5
6	T	7 8	5 21	2 24	6 10	7 5	5 24	2 20	2 56	7 1	5 28	2 13
7	W	7 7	5 22	3 28	7 16	7 3	5 25	3 22	4 0	7 0	5 29	3 15
8	T	7 5	5 24	4 24	8 16	7 2	5 27	4 18	5 2	6 59	5 30	4 11
9	F	7 4	5 25	5 14	9 13	7 1	5 28	5 7	5 59	6 58	5 31	4 59
10	S	7 3	5 26	5 52	10 6	7 0	5 29	5 47	6 52	6 57	5 32	5 40
11	**G**	7 2	5 27	6 27	10 55	6 59	5 30	6 21	7 41	6 56	5 33	6 15
12	M	7 0	5 29	6 56	11 36	6 58	5 32	6 48	8 22	6 55	5 34	6 43
13	T	6 59	5 30	sets.	morn.	6 56	5 33	sets.	8 56	6 54	5 36	sets.
14	W	6 58	5 31	6 57	0 12	6 55	5 34	6 59	9 28	6 52	5 37	7 0
15	T	6 56	5 33	8 1	0 42	6 54	5 35	8 1	9 58	6 51	5 38	8 1
16	F	6 55	5 34	9 4	1 12	6 52	5 36	9 5	10 33	6 50	5 39	9 4
17	S	6 53	5 35	10 11	1 47	6 51	5 38	10 8	11 10	6 49	5 40	10 5
18	**G**	6 52	5 37	11 19	2 24	6 50	5 39	11 16	11 50	6 48	5 41	11 12
19	M	6 51	5 38	morn.	3 4	6 48	5 40	morn.	morn.	6 46	5 42	morn.
20	T	6 49	5 39	0 30	3 51	6 47	5 41	0 26	0 37	6 45	5 43	0 21
21	W	6 48	5 40	1 44	4 48	6 46	5 42	1 39	1 34	6 43	5 45	1 32
22	T	6 46	5 41	2 55	5 55	6 44	5 43	2 48	2 41	6 42	5 46	2 41
23	F	6 45	5 43	3 58	7 13	6 43	5 44	3 50	3 59	6 40	5 47	3 43
24	S	6 43	5 44	4 51	8 17	6 41	5 46	4 45	5 13	6 39	5 48	4 38
25	**G**	6 41	5 45	5 33	9 36	6 40	5 47	5 26	6 22	6 38	5 49	5 21
26	M	6 40	5 46	6 6	10 37	6 38	5 48	6 3	7 23	6 36	5 50	5 59
27	T	6 38	5 48	6 33	11 30	6 37	5 49	6 32	8 16	6 35	5 51	6 29
28	W	6 36	5 49	6 57	ev. 13	6 35	5 51	6 57	8 59	6 34	5 52	6 57

American Short-Horn Herd Book. Vol. 15. Buffalo: Lewis F. Allen. May 25, 1876.
American Short-Horn Record. Vol. 5. By A. J. Alexander, Spring Station, Ky. May 25, '76.
An Egg Farm. By H. H. Stoddard. New-York: Orange Judd Company. April 13, 1876.
Angora Goats imported by John S. Harris of California. March 30, 1876.
Apples Exported from Rochester to London. March 2, 1876.
Australia—Extraordinary Sale of Richard Morton's Short-Horns. Nov. 18, 1875.
Ayrshire Breeders' Association Meeting at Springfield, Mass. Feb. 3, 1876.
Ayrshire shipments to California for P. Coutts. Mayfield. Oct. 7, 1875; Feb. 3, 1876.
Bedford, Benj. C., Harristown, Ill. Obituary. March 30, 1876.

3d MONTH. **MARCH, 1877.** 31 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
THIRD QUARTER,	6	5 17 ev.	5 5 ev.	4 53 ev.	1	12	12	28
NEW MOON, . . .	14	10 10 ev.	9 58 ev.	9 46 ev.	9	12	10	36
FIRST QUARTER,	22	8 25 mo.	8 13 mo.	8 1 mo.	17	12	8	22
FULL MOON, . . .	29	1 5 mo.	0 53 mo.	0 41 mo.	25	12	5	57

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	T	6 34	5 50	8 29	ev. 51	6 33	5 52	8 29	9 37	6 32	5 53	8 27
2	F	6 34	5 51	9 44	1 30	6 32	5 53	9 42	10 16	6 31	5 54	9 34
3	S	6 32	5 52	10 57	2 13	6 31	5 54	10 52	10 59	6 30	5 55	10 49
4	G	6 30	5 54	morn.	3 8	6 29	5 55	morn.	11 54	6 29	5 56	11 57
5	M	6 28	5 55	0 9	3 47	6 28	5 56	0 3	ev. 33	6 28	5 57	morn.
6	T	6 27	5 56	1 17	4 42	6 27	5 57	1 11	1 28	6 26	5 58	1 4
7	W	6 25	5 57	2 18	5 44	6 26	5 59	2 11	2 30	6 24	5 59	2 4
8	T	6 23	5 58	3 10	6 48	6 24	6 0	3 4	3 34	6 23	6 0	2 56
9	F	6 22	5 59	3 53	7 49	6 22	6 1	3 47	4 35	6 21	6 1	3 40
10	S	6 20	6 1	4 28	8 43	6 20	6 2	4 23	5 29	6 19	6 2	4 16
11	G	6 18	6 2	4 56	9 34	6 18	6 3	4 52	6 20	6 18	6 3	4 47
12	M	6 17	6 3	5 20	10 19	6 17	6 4	5 17	7 5	6 16	6 4	5 13
13	T	6 15	6 4	5 40	11 0	6 15	6 5	5 38	7 46	6 15	6 5	5 36
14	W	6 13	6 5	sets.	11 37	6 13	6 6	sets.	8 24	6 13	6 6	sets.
15	T	6 11	6 7	6 56	morn.	6 12	6 7	6 56	8 57	6 12	6 7	6 56
16	F	6 10	6 8	8 2	0 11	6 10	6 8	8 1	9 29	6 10	6 8	7 59
17	S	6 9	6 9	9 11	0 43	6 9	6 9	9 8	10 3	6 9	6 9	9 5
18	G	6 7	6 10	10 23	1 18	6 7	6 10	10 18	10 44	6 7	6 10	10 13
19	M	6 5	6 11	11 34	1 58	6 5	6 11	11 24	11 30	6 5	6 11	11 22
20	T	6 3	6 12	morn.	2 44	6 3	6 12	morn.	morn.	6 3	6 12	morn.
21	W	6 1	6 13	0 45	3 36	6 2	6 13	0 39	0 22	6 2	6 13	0 32
22	T	5 59	6 15	1 50	4 38	6 1	6 14	1 43	1 24	6 1	6 14	1 36
23	F	5 58	6 16	2 45	5 50	6 0	6 15	2 38	2 36	6 0	6 15	2 32
24	S	5 56	6 17	3 29	7 6	5 58	6 16	3 24	3 52	5 58	6 16	3 18
25	G	5 54	6 18	4 5	8 14	5 56	6 17	4 1	5 0	5 56	6 17	3 56
26	M	5 52	6 19	4 34	9 15	5 54	6 18	4 31	6 1	5 55	6 18	4 28
27	T	5 50	6 20	4 58	10 11	5 53	6 19	4 57	6 57	5 54	6 19	4 56
28	W	5 49	6 21	5 21	11 1	5 52	6 20	5 22	7 47	5 53	6 20	5 22
29	T	5 47	6 22	rises.	11 46	5 50	6 21	rises.	8 32	5 51	6 21	rises.
30	F	5 45	6 24	8 32	ev. 24	5 48	6 22	8 29	9 10	5 49	6 22	8 27
31	S	5 43	6 25	9 47	1 2	5 46	6 23	9 42	9 48	5 47	6 23	9 38

Beekeepers—Northeastern Association Meeting at Rome, N. Y. Feb. 10, 1876.
Bell. Thomas, Eatontown, N. J. Obituary. June 15, 1876.
Bulletins of the Bussey Institution. By Prof Storer. Boston: Jno. Allyn. July 27, 1876.
Canada Short-Horn Herd Book. Vol. 3d. Toronto: H. C. Thomson. March 16, 1876.
Cattle, Sheep and Swine shown at the Centennial. Sept. 28; Oct. 5, 26, 1876.
Centennial Exhibition Opened at Philadelphia. May 11, 18, 25, 1876.
Chenery, W. W., Belmont, Mass. Obituary. Aug. 3, 1876.
Connecticut Experiment Station, Middletown. First Annual Report. Aug. 10, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
THIRD QUARTER,	5	11 46 mo.	11 34 mo.	11 22 mo.	1	12	3	48
NEW MOON, . . .	13	1 6 ev.	0 54 ev.	0 42 ev.	9	12	1	28
FIRST QUARTER,	20	2 53 ev.	2 41 ev.	2 29 ev.	17	11	59	26
FULL MOON, . . .	27	11 52 mo.	11 40 mo.	11 28 mo.	25	11	57	49

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	G	5 42	6 25	11 0	1 45	5 43	6 25	10 53	10 32	5 44	6 24	10 46
2	M	5 41	6 27	morn.	2 31	5 41	6 26	11 58	11 18	5 42	6 25	11 50
3	T	5 39	6 28	0 6	3 21	5 40	6 27	morn.	ev. 8	5 41	6 26	morn.
4	W	5 37	6 29	1 3	4 14	5 38	6 28	0 55	1 1	5 39	6 27	0 46
5	T	5 35	6 30	1 52	5 12	5 36	6 29	1 43	1 59	5 38	6 28	1 36
6	F	5 33	6 31	2 29	6 15	5 35	6 30	2 21	3 1	5 36	6 29	2 15
7	S	5 31	6 32	3 1	7 12	5 33	6 31	2 53	3 58	5 35	6 30	2 49
8	G	5 30	6 33	3 25	8 4	5 31	6 32	3 20	4 50	5 33	6 31	3 17
9	M	5 28	6 34	3 47	8 50	5 30	6 33	3 43	5 36	5 32	6 32	3 40
10	T	5 27	6 35	4 4	9 35	5 28	6 34	4 2	6 21	5 30	6 33	4 2
11	W	5 25	6 37	4 22	10 19	5 27	6 35	4 22	7 5	5 29	6 33	4 21
12	T	5 23	6 38	4 41	11 1	5 25	6 36	4 43	7 47	5 27	6 34	4 44
13	F	5 22	6 39	sets.	11 40	5 24	6 37	sets.	8 26	5 26	6 35	sets.
14	S	5 20	6 40	8 9	morn.	5 22	6 38	8 6	9 4	5 24	6 36	8 1
15	G	5 18	6 42	9 23	0 18	5 21	6 39	9 19	9 43	5 23	6 37	9 12
16	M	5 17	6 43	10 36	0 57	5 19	6 40	10 30	10 29	5 21	6 38	10 23
17	T	5 15	6 44	11 44	1 43	5 18	6 41	11 36	11 21	5 20	6 39	11 29
18	W	5 14	6 45	morn.	2 35	5 16	6 42	morn.	morn.	5 19	6 40	morn.
19	T	5 12	6 46	0 42	3 32	5 15	6 43	0 36	0 28	5 18	6 41	0 28
20	F	5 10	6 47	1 29	4 34	5 13	6 44	1 23	1 20	5 16	6 42	1 16
21	S	5 9	6 48	2 5	5 43	5 12	6 45	2 1	2 29	5 14	6 43	1 55
22	G	5 8	6 49	2 36	6 50	5 10	6 46	2 33	3 36	5 13	6 44	2 30
23	M	5 6	6 50	3 0	7 51	5 9	6 47	2 59	4 37	5 12	6 45	2 57
24	T	5 4	6 51	3 25	8 46	5 7	6 48	3 24	5 32	5 11	6 46	3 23
25	W	5 3	6 52	3 46	9 39	5 6	6 49	3 47	6 25	5 10	6 47	3 48
26	T	5 1	6 54	4 8	10 29	5 4	6 50	4 11	7 15	5 8	6 48	4 13
27	F	5 0	6 55	rises.	11 17	5 3	6 51	rises.	8 3	5 7	6 49	rises.
28	S	4 58	6 56	8 37	ev. 0	5 2	6 53	8 32	8 46	5 5	6 50	8 26
29	G	4 57	6 57	9 47	0 36	5 1	6 54	9 40	9 22	5 3	6 51	9 33
30	M	4 56	6 58	10 49	1 25	4 59	6 55	10 43	10 11	5 2	6 52	10 34

Cooper, T. S., Coopersburg Pa. Imp. Oxford-Downs and Berkshires. May 25; Aug. 31, '76.
Convention of Short-Horn Breeders at Toronto. Dec. 9, 1875.
Cotswold Sheep imported by C. C. Parks. April 27; by T. S. Cooper, Aug. 31, 1876.
COUNTRY GENTLEMAN—Circulation at 5,624 Post-offices, against 5,206 in 1874. June 8, '76.
Darwin on Movements of Climbing Plants. New-York: D. Appleton & Co. Jan. 13, '76.
Downing's Second Appendix of Fruits and Fruit Trees. May 25, 1876.
Duncan, W. R., Towanda, Ill. Obituary. Oct. 12, 1876.
Ellwanger & Barry. New Catalogue, Mt. Hope Nurseries, Rochester, N. Y. Feb. 17, 1876.
Ensilage—New Method of Preserving Fodder. Oct. 21, 1875; March 23; Oct. 5, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
THIRD QUARTER,	5	6 35 mo.	6 23 mo.	6 11 mo.	1	11 56 55
NEW MOON, . . .	13	0 45 mo.	0 33 mo.	0 21 mo.	9	11 56 15
FIRST QUARTER,	19	8 22 ev.	8 0 ev.	7 48 ev.	17	11 56 11
FULL MOON, . . .	26	11 21 ev.	11 9 ev.	10 57 ev.	25	11 56 40

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	T	4 55	7 0	11 41	2 12	4 58	6 56	11 35	10 58	5 2	6 52	11 28
2	W	4 53	7 1	morn.	3 0	4 57	6 57	morn.	11 46	5 1	6 53	morn.
3	T	4 52	7 2	0 24	3 49	4 56	6 58	0 17	ev. 35	5 0	6 54	0 11
4	F	4 50	7 3	0 58	4 39	4 55	6 59	0 53	1 25	4 58	6 55	0 46
5	S	4 49	7 4	1 25	5 29	4 54	7 0	1 21	2 15	4 57	6 56	1 16
6	G	4 48	7 5	1 47	6 22	4 52	7 1	1 44	3 8	4 56	6 57	1 41
7	M	4 47	7 6	2 7	7 13	4 51	7 2	2 6	3 59	4 55	6 58	2 4
8	T	4 46	7 7	2 26	8 1	4 50	7 3	2 26	4 47	4 54	6 59	2 25
9	W	4 45	7 8	2 45	8 47	4 49	7 4	2 45	5 33	4 53	7 0	2 46
10	T	4 44	7 9	3 4	9 34	4 48	7 5	3 6	6 20	4 52	7 1	3 6
11	F	4 43	7 10	3 25	10 23	4 47	7 6	3 28	7 9	4 51	7 2	3 32
12	S	4 42	7 11	sets.	11 13	4 45	7 7	sets.	7 59	4 50	7 3	sets.
13	G	4 41	7 12	8 21	morn.	4 44	7 8	8 15	8 46	4 49	7 4	8 8
14	M	4 40	7 13	9 33	0 0	4 43	7 9	9 25	9 32	4 48	7 4	9 18
15	T	4 39	7 14	10 36	0 46	4 42	7 10	10 28	10 22	4 47	7 5	10 20
16	W	4 38	7 15	11 27	1 36	4 41	7 11	11 20	11 17	4 46	7 6	11 14
17	T	4 37	7 16	morn.	2 31	4 40	7 12	morn.	morn.	4 45	7 7	11 56
18	F	4 36	7 17	0 7	3 27	4 39	7 13	0 1	0 13	4 44	7 8	morn.
19	S	4 36	7 18	0 40	4 23	4 38	7 14	0 36	1 9	4 43	7 9	0 32
20	G	4 35	7 19	1 6	5 21	4 38	7 15	1 3	2 6	4 43	7 10	1 0
21	M	4 34	7 20	1 28	6 21	4 37	7 16	1 27	3 7	4 42	7 11	1 26
22	T	4 33	7 21	1 51	7 19	4 36	7 17	1 51	4 5	4 41	7 12	1 52
23	W	4 32	7 22	2 13	8 14	4 36	7 18	2 15	5 0	4 40	7 12	2 17
24	T	4 32	7 23	2 36	9 6	4 35	7 19	2 40	5 52	4 40	7 13	2 43
25	F	4 31	7 24	3 3	9 59	4 34	7 19	3 7	6 45	4 39	7 14	3 12
26	S	4 30	7 25	rises.	10 52	4 34	7 20	rises.	7 38	4 39	7 15	rises.
27	G	4 29	7 26	8 37	11 41	4 33	7 20	8 28	8 27	4 38	7 16	8 21
28	M	4 29	7 27	9 33	ev. 23	4 32	7 21	9 26	9 9	4 38	7 16	9 18
29	T	4 28	7 28	10 18	1 7	4 32	7 22	10 11	9 53	4 37	7 17	10 4
30	W	4 27	7 29	10 57	1 51	4 31	7 23	10 50	10 37	4 37	7 18	10 44
31	T	4 26	7 29	11 26	2 35	4 31	7 24	11 21	11 21	4 36	7 18	11 15

Essay on Berkshires. By A. B. Allen. Springfield, Ill.: A. M. Garland. May 18, 1876.
Farmers' Vacation. By Col. G. E. Waring, Jr. Boston: Osgood & Co. Dec. 23, 1875.
Farmers' Veterinary Adviser. By Prof. Jas. Law, Cornell University. July 13, 1876.
Floral Guide, and Flower and Vegetable Garden, by Jas. Vick, Rochester, N. Y. Dec. 23, '75.
Foot and Mouth Disease in Canada, Dec. 23, 1875; Importations Prohibited. Jan. 6, 1876.
Fordon, George, Geneva, N. Y. Obituary. March 16, 1876.
Fresh Meat Shipments to England. March 2, 9, 16, 23; May 4; Aug. 3; Sept. 28, 1876.
Fruit Trees Exported to Australia by Ellwanger & Barry. Aug. 24, 1876.

6th MONTH. **JUNE, 1877.** 30 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
THIRD QUARTER,	4	0 27 mo.	0 15 mo.	0 3 mo.	1	11	57	32
NEW MOON, . . .	11	9 48 mo.	9 36 mo.	9 24 mo.	9	11	58	55
FIRST QUARTER,	18	1 40 mo.	1 28 mo.	1 16 mo.	17	12	0	41
FULL MOON, . . .	25	0 9 ev.	11 57 mo.	11 45 mo.	25	12	2	24

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	F	4 25	7 30	11 48	3 17	4 30	7 25	11 46	ev. 3	4 36	7 19	11 42
2	S	4 25	7 31	morn.	3 59	4 30	7 25	morn.	0 45	4 36	7 20	morn.
3	G	4 25	7 31	0 11	4 43	4 30	7 26	0 10	1 29	4 35	7 20	0 6
4	M	4 24	7 32	0 30	5 30	4 29	7 27	0 29	2 16	4 35	7 21	0 28
5	T	4 24	7 33	0 48	6 19	4 29	7 27	0 48	3 5	4 35	7 22	0 48
6	W	4 23	7 34	1 6	7 10	4 29	7 28	1 7	3 56	4 34	7 23	1 9
7	T	4 23	7 34	1 27	8 1	4 28	7 29	1 30	4 47	4 34	7 23	1 32
8	F	4 23	7 35	1 51	8 55	4 28	7 29	1 55	5 41	4 34	7 24	1 59
9	S	4 22	7 35	2 21	9 53	4 28	7 30	2 26	6 39	4 34	7 24	2 31
10	G	4 22	7 36	sets.	10 53	4 28	7 30	sets.	7 39	4 34	7 25	sets.
11	M	4 22	7 37	8 23	11 50	4 28	7 31	8 14	8 36	4 34	7 25	8 7
12	T	4 22	7 37	9 19	morn.	4 28	7 31	9 11	9 26	4 34	7 25	9 5
13	W	4 22	7 37	10 5	0 40	4 28	7 32	10 0	10 16	4 34	7 26	9 53
14	T	4 22	7 38	10 40	1 30	4 28	7 32	10 35	11 8	4 34	7 26	10 31
15	F	4 22	7 38	11 9	2 22	4 28	7 33	11 6	11 58	4 34	7 27	11 3
16	S	4 22	7 39	11 34	3 12	4 28	7 33	11 33	morn.	4 34	7 27	11 31
17	G	4 22	7 39	11 55	4 1	4 28	7 33	11 55	0 47	4 34	7 28	11 56
18	M	4 22	7 40	morn.	4 52	4 28	7 34	morn.	1 38	4 34	7 28	morn.
19	T	4 22	7 40	0 17	5 47	4 28	7 34	0 19	2 33	4 34	7 28	0 20
20	W	4 22	7 40	0 40	6 45	4 29	7 34	0 43	3 31	4 34	7 28	0 47
21	T	4 23	7 40	1 5	7 41	4 29	7 34	1 9	4 27	4 35	7 28	1 13
22	F	4 23	7 40	1 35	8 40	4 29	7 35	1 42	5 26	4 35	7 29	1 47
23	S	4 23	7 41	2 12	9 37	4 29	7 35	2 19	6 23	4 35	7 29	2 26
24	G	4 24	7 41	2 55	10 33	4 30	7 35	3 3	7 19	4 35	7 29	3 11
25	M	4 24	7 41	rises.	11 24	4 30	7 35	rises.	8 10	4 36	7 29	rises.
26	T	4 25	7 41	8 55	ev. 10	4 30	7 35	8 48	8 56	4 36	7 29	8 42
27	W	4 25	7 41	9 26	0 49	4 31	7 35	9 21	9 35	4 37	7 29	9 15
28	T	4 25	7 41	9 53	1 26	4 31	7 35	9 49	10 12	4 37	7 29	9 45
29	F	4 26	7 41	10 14	2 4	4 32	7 35	10 11	10 50	4 37	7 29	10 8
30	S	4 26	7 41	10 34	2 41	4 32	7 35	10 32	11 27	4 38	7 29	10 30

Grange Mentor, by Rev. A. B. Grosh New-York: Clark & Maynard. March 23, 1876.
Grapes—New Seedlings of J. H. Ricketts. Newburgh. Oct. 14, 1875.
Grasses—Handbook by John Henderson, Northport, N. Y. Oct. 21, 1875
Groom & Son, B.B., Winchester, Ky. Short-Horns Sale (av. $1,644 on 72 head) Oct. 21, '75.
Guano—Quality Guaranteed by the Peruvian Government. July 13, 1876.
Hardin's New System of Setting Milk. Feb. 17; April 6, 1876.
Harvesting Machinery, and Fruit. at the Centennial. July 6, 13; Sept. 21, 1876.
Hendrick's Seed Store Established—Font Grove Nurseries. March 9; April 13, 1876
Holloway, Robt., Alexis, Ill. Sale of Short-Horns (62 head av. $1,052.50.) June 1, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
THIRD QUARTER,	3	4 18 ev.	4 6 ev.	3 54 ev.	1	12	3	36
NEW MOON, . . .	10	5 22 ev.	5 10 ev.	4 58 ev.	9	12	4	58
FIRST QUARTER,	17	8 28 mo.	8 16 mo.	8 4 mo.	17	12	5	53
FULL MOON, . . .	25	2 35 mo.	2 23 mo.	2 11 mo.	25	12	6	14

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon						CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.						CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.					
		SUN RISES		SUN SETS.		MOON RISES.		H. W. BOST'N		SUN RISES		SUN SETS.		MOON RISES.		H. W. N. Y.		SUN RISES		SUN SETS.		MOON RISES.	
		H	M	H	M	H.	M.	H	M	H	M	H	M	H	M	H	M	H	M	H	M	H	M
1	G	4	27	7	41	10	52	3	18	4	32	7	35	10	52	ev.	4	4	38	7	29	10	51
2	M	4	27	7	40	11	10	3	57	4	33	7	35	11	11	0	43	4	39	7	29	11	12
3	T	4	28	7	40	11	27	4	38	4	34	7	35	11	30	1	24	4	39	7	29	11	32
4	W	4	28	7	40	11	50	5	26	4	34	7	34	11	53	2	12	4	40	7	29	11	57
5	T	4	29	7	40	morn.		6	21	4	35	7	34	morn.		3	7	4	40	7	28	morn.	
6	F	4	30	7	39	0	16	7	25	4	35	7	34	0	22	4	11	4	41	7	28	0	26
7	S	4	30	7	39	0	50	8	26	4	36	7	34	0	56	5	12	4	41	7	28	1	3
8	G	4	31	7	39	1	34	9	33	4	37	7	33	1	42	6	19	4	42	7	28	1	49
9	M	4	32	7	38	2	31	10	40	4	37	7	33	2	39	7	26	4	43	7	27	2	47
10	T	4	32	7	38	sets.		11	40	4	38	7	32	sets.		8	26	4	43	7	27	sets.	
11	W	4	33	7	37	8	37	morn.		4	39	7	32	8	32	9	16	4	44	7	26	8	27
12	T	4	34	7	37	9	10	0	30	4	39	7	32	9	6	10	1	4	45	7	26	9	2
13	F	4	35	7	36	9	36	1	15	4	40	7	31	9	33	10	49	4	45	7	26	9	32
14	S	4	36	7	36	9	59	2	3	4	41	7	30	9	58	11	33	4	46	7	25	9	58
15	G	4	36	7	35	10	21	2	47	4	41	7	30	10	22	morn.		4	47	7	25	10	23
16	M	4	37	7	34	10	44	3	31	4	42	7	29	10	47	0	17	4	48	7	24	10	49
17	T	4	38	7	34	11	9	4	19	4	43	7	29	11	12	1	5	4	48	7	23	11	16
18	W	4	39	7	33	11	37	5	12	4	44	7	28	11	42	1	58	4	49	7	23	11	47
19	T	4	40	7	32	morn.		6	14	4	45	7	27	morn.		3	0	4	50	7	22	morn.	
20	F	4	41	7	32	0	12	7	17	4	46	7	27	0	18	4	3	4	51	7	22	0	25
21	S	4	42	7	31	0	53	8	18	4	47	7	26	1	0	5	4	4	52	7	21	1	8
22	G	4	43	7	30	1	43	9	19	4	48	7	25	1	50	6	5	4	52	7	20	1	59
23	M	4	44	7	29	2	41	10	16	4	48	7	24	2	48	7	2	4	53	7	19	2	55
24	T	4	45	7	28	rises.		11	6	4	49	7	23	rises.		7	52	4	54	7	18	rises.	
25	W	4	45	7	27	7	56	11	56	4	50	7	22	7	51	8	36	4	55	7	18	7	47
26	T	4	46	7	26	8	21	ev.	25	4	51	7	21	8	17	9	11	4	56	7	17	8	13
27	F	4	47	7	25	8	37	0	58	4	52	7	21	8	37	9	44	4	57	7	16	8	35
28	S	4	48	7	24	8	58	1	30	4	53	7	20	8	57	10	16	4	57	7	15	8	56
29	G	4	50	7	23	9	16	2	4	4	54	7	19	9	16	10	50	4	58	7	14	9	17
30	M	4	51	7	22	9	34	2	39	4	55	7	18	9	34	11	25	4	59	7	13	9	37
31	T	4	52	7	21	9	54	3	16	4	56	7	17	9	57	ev.	2	5	0	7	12	9	59

Horticulturist, New-York. sold to Gardener's Monthly, Philadelphia, Pa. Dec. 30, 1875.
Hull, Dr E S, Alton, Ill. Obituary. Nov. 25, 1875.
Indiana Agricultural Report. Twenty-fifth Annual Volume June 27, 1876.
Jerseys and Guernseys imported by Col. M. C Weld. May 11, 1876.
LeCouteur, Sir John, St. Helers, Jersey. Obituary. Jan. 27, 1876.
Maine State Board of Agriculture. Twentieth Annual Report. Sept. 7, 1876.
Manual of the Apiary by Prof. A. J. Cook, Lansing, Mich. May 18, 1876.
Massachusetts Health Report. Seventh Annual Volume. June 29, 1876.

8th MONTH. # AUGUST, 1877. 31 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
THIRD QUARTER,	2	5 37 mo.	5 25 mo.	5 13 mo.	1	12	6	2
NEW MOON, . . .	9	0 33 mo.	0 21 mo.	0 9 8th.	9	12	5	12
FIRST QUARTER,	15	5 44 ev.	5 32 ev.	5 20 ev.	17	12	3	46
FULL MOON, . . .	23	6 26 ev.	6 14 ev.	6 2 ev.	25	12	1	47

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	W	4 52	7 20	10 16	3 58	4 57	7 16	10 21	ev. 44	5 1	7 11	10 25
2	T	4 54	7 18	10 44	4 47	4 58	7 14	10 52	1 33	5 2	7 10	10 57
3	F	4 55	7 17	11 22	5 47	4 59	7 13	11 30	2 33	5 3	7 9	11 37
4	S	4 56	7 16	morn.	6 56	5 0	7 12	morn.	3 42	5 4	7 8	morn.
5	G	4 57	7 15	0 12	8 8	5 1	7 11	0 20	4 54	5 5	7 7	0 28
6	M	4 58	7 14	1 16	9 19	5 2	7 10	1 24	6 5	5 6	7 6	1 32
7	T	4 59	7 12	2 32	10 28	5 3	7 9	2 40	7 14	5 6	7 5	2 47
8	W	5 0	7 11	sets.	11 26	5 3	7 7	sets.	8 12	5 7	7 3	sets.
9	T	5 1	7 10	7 34	morn.	5 4	7 6	7 32	9 0	5 8	7 2	7 29
10	F	5 2	7 8	7 58	0 14	5 5	7 5	7 58	9 40	5 9	7 1	7 57
11	S	5 3	7 7	8 22	0 54	5 6	7 3	8 23	10 21	5 10	7 0	8 24
12	G	5 4	7 5	8 46	1 35	5 7	7 2	8 49	11 5	5 11	6 59	8 50
13	M	5 5	7 4	9 10	2 19	5 8	7 1	9 14	11 49	5 12	6 57	9 17
14	T	5 6	7 3	9 37	3 3	5 9	7 0	9 43	morn.	5 13	6 56	9 49
15	W	5 7	7 1	10 11	3 52	5 10	6 58	10 18	0 38	5 14	6 55	10 25
16	T	5 8	7 0	10 49	4 45	5 11	6 57	10 58	1 31	5 15	6 53	11 5
17	F	5 9	6 58	11 38	5 47	5 12	6 55	11 46	2 33	5 16	6 52	11 55
18	S	5 10	6 57	morn.	6 56	5 13	6 54	morn.	3 42	5 17	6 51	morn.
19	G	5 11	6 55	0 33	7 59	5 14	6 52	0 41	4 45	5 17	6 49	0 48
20	M	5 13	6 54	1 34	8 57	5 16	6 51	1 41	5 43	5 18	6 48	1 49
21	T	5 14	6 52	2 40	9 51	5 17	6 49	2 47	6 37	5 19	6 47	2 52
22	W	5 15	6 51	rises.	10 39	5 18	6 48	rises.	7 25	5 20	6 46	rises.
23	T	5 16	6 49	6 44	11 20	5 19	6 46	6 43	8 6	5 21	6 44	6 40
24	F	5 17	6 47	7 3	11 56	5 19	6 45	7 3	8 42	5 22	6 42	7 2
25	S	5 18	6 46	7 21	ev. 27	5 20	6 44	7 22	9 13	5 23	6 41	7 21
26	G	5 19	6 44	7 39	0 56	5 21	6 42	7 41	9 42	5 24	6 39	7 42
27	M	5 20	6 43	7 59	1 29	5 22	6 41	8 3	10 15	5 25	6 38	8 4
28	T	5 21	6 41	8 20	2 4	5 23	6 39	8 24	10 50	5 25	6 36	8 28
29	W	5 22	6 39	8 47	2 44	5 24	6 37	8 53	11 30	5 26	6 35	8 58
30	T	5 23	6 38	9 19	3 29	5 25	6 36	9 27	ev. 15	5 27	6 33	9 33
31	F	5 24	6 36	10 3	4 27	5 26	6 34	10 12	1 13	5 28	6 32	10 19

9th MONTH. **SEPTEMBER, 1877.** 30 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H.	M.	S.
NEW MOON, . . .	7	8 16 mo.	8 4 mo.	7 52 mo.	1	11	59	43
FIRST QUARTER,	14	6 24 mo.	6 12 mo.	6 0 mo.	9	11	57	4
FULL MOON, . . .	22	10 50 mo.	10 38 mo.	10 26 mo.	17	11	54	16
THIRD QUARTER,	30	1 36 mo.	1 24 mo.	1 12 mo.	25	11	51	28

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon. SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois. SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California. SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H M	H M	H M	H M	H M	H M	H M	H M	H M
1	S	5 25	6 34	11 0	5 27	5 27	6 32	11 8	2 13	5 29	6 30	11 15
2	G	5 26	6 32	morn.	6 42	5 28	6 31	morn.	3 28	5 30	6 29	morn.
3	M	5 28	6 31	0 8	7 57	5 29	6 29	0 17	4 43	5 31	6 27	0 23
4	T	5 29	6 29	1 26	9 3	5 30	6 28	1 32	5 49	5 32	6 26	1 37
5	W	5 30	6 27	2 48	10 7	5 31	6 26	2 53	6 53	5 33	6 24	2 57
6	T	5 31	6 26	4 10	11 2	5 32	6 24	4 13	7 48	5 34	6 23	4 16
7	F	5 32	6 24	sets.	11 50	5 33	6 23	sets.	8 36	5 34	6 21	sets.
8	S	5 33	6 22	6 47	morn.	5 34	6 21	6 48	9 15	5 35	6 20	6 50
9	G	5 34	6 20	7 11	0 29	5 35	6 19	7 14	9 54	5 36	6 18	7 17
10	M	5 35	6 19	7 39	1 8	5 36	6 18	7 43	10 38	5 37	6 16	7 47
11	T	5 36	6 17	8 10	1 52	5 37	6 16	8 16	11 24	5 38	6 15	8 22
12	W	5 37	6 15	8 47	2 38	5 38	6 14	8 54	morn.	5 39	6 13	9 1
13	T	5 38	6 13	9 33	3 29	5 39	6 13	9 41	0 15	5 40	6 12	9 48
14	F	5 39	6 12	10 27	4 24	5 40	6 11	10 35	1 10	5 41	6 10	10 42
15	S	5 40	6 10	11 27	5 26	5 41	6 9	11 33	2 12	5 42	6 8	11 40
16	G	5 41	6 8	morn.	6 31	5 42	6 7	morn.	3 17	5 43	6 7	morn.
17	M	5 42	6 6	0 30	7 33	5 43	6 6	0 36	4 19	5 43	6 5	0 42
18	T	5 43	6 5	1 35	8 27	5 44	6 4	1 40	5 13	5 44	6 4	1 45
19	W	5 44	6 3	2 39	9 17	5 45	6 2	2 42	6 3	5 45	6 2	2 46
20	T	5 46	6 1	3 40	10 1	5 46	6 1	3 43	6 47	5 46	6 0	3 45
21	F	5 47	5 59	4 42	10 42	5 47	5 59	4 43	7 28	5 47	5 58	4 45
22	S	5 48	5 57	rises.	11 20	5 48	5 57	rises.	8 6	5 48	5 57	rises.
23	G	5 49	5 56	6 5	11 55	5 49	5 56	6 7	8 41	5 49	5 56	6 10
24	M	5 50	5 55	6 26	ev. 27	5 50	5 54	6 29	9 13	5 50	5 54	6 34
25	T	5 51	5 53	6 52	1 0	5 51	5 52	6 56	9 46	5 51	5 52	7 1
26	W	5 52	5 51	7 23	1 39	5 52	5 51	7 28	10 25	5 52	5 51	7 34
27	T	5 53	5 49	8 2	2 23	5 53	5 48	8 8	11 9	5 52	5 49	8 16
28	F	5 54	5 47	8 53	3 12	5 54	5 47	9 1	11 58	5 53	5 48	9 8
29	S	5 55	5 45	9 55	4 11	5 55	5 45	10 3	ev. 57	5 54	5 46	10 10
30	G	5 56	5 43	11 7	5 17	5 56	5 44	11 13	2 3	5 55	5 44	11 20

New-York State Agricult'l Society. Annual Meeting and Official Report. Jan. 27, 1876.
Ohio Horticultural Society. Ninth Annual Report. Aug. 3, 1876.
Patrons of Husbandry on the Pacific Coast. By Prof. Carr. San Francisco: A. L. Bancroft & Co. Nov. 11, 1875.
Pickrell, Mrs. A. P., Mechanicsburg, Ill. Obituary. March 9, 1876.
Prentice, E. P., Albany, N. Y. Obituary July 13, 20, 1876
Prickly Comfrey—Introduction as a New Forage Plant. April 6; July 27, 1876.
Raisin Making Established in California. March 9, 1876.
Randall, Henry S., Cortland Village, N. Y. Obituary. Aug 24, 1876.

10th MONTH. # OCTOBER, 1877. 31 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
NEW MOON, . . .	6	5 14 ev.	5 2 ev.	4 50 ev.	1	11 49 29
FIRST QUARTER,	13	10 58 ev.	10 46 ev.	10 34 ev.	9	11 47 9
FULL MOON, . . .	22	2 47 mo.	2 35 mo.	2 23 mo.	17	11 45 19
THIRD QUARTER,	29	9 37 mo.	9 25 mo.	9 13 mo.	25	11 44 6

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H. M.	H M	H M	H M	H M	H M	H M	H M	H M
1	M	5 58	5 42	morn.	6 30	5 56	5 42	morn.	3 16	5 56	5 42	morn.
2	T	5 59	5 40	0 24	7 39	5 58	5 41	0 29	4 25	5 57	5 41	0 35
3	W	6 0	5 38	1 44	8 41	6 0	5 39	1 47	5 27	5 58	5 40	1 51
4	T	6 1	5 36	3 3	9 37	6 0	5 37	3 5	6 23	5 59	5 38	3 7
5	F	6 2	5 35	4 22	10 32	6 1	5 36	4 22	7 18	6 0	5 37	4 23
6	S	6 3	5 33	sets.	11 21	6 2	5 34	sets.	8 7	6 1	5 35	sets.
7	G	6 4	5 31	5 36	morn.	6 3	5 32	5 39	8 51	6 2	5 33	5 43
8	M	6 5	5 30	6 6	0 5	6 4	5 31	6 11	9 31	6 3	5 32	6 16
9	T	6 6	5 28	6 41	0 45	6 5	5 29	6 47	10 15	6 4	5 30	6 54
10	W	6 7	5 26	7 25	1 29	6 6	5 28	7 32	11 4	6 5	5 29	7 39
11	T	6 8	5 25	8 17	2 18	6 7	5 26	8 25	11 56	6 6	5 27	8 32
12	F	6 10	5 23	9 16	3 10	6 8	5 24	9 23	morn.	6 7	5 26	9 29
13	S	6 11	5 21	10 19	4 3	6 10	5 23	10 25	0 49	6 8	5 25	10 32
14	G	6 12	5 20	11 24	4 59	6 11	5 21	11 29	1 45	6 9	5 23	11 35
15	M	6 13	5 18	morn.	5 58	6 12	5 20	morn.	2 44	6 10	5 22	morn.
16	T	6 15	5 16	0 28	6 53	6 13	5 18	0 32	3 39	6 11	5 20	0 36
17	W	6 16	5 15	1 30	7 44	6 14	5 17	1 33	4 30	6 12	5 19	1 35
18	T	6 17	5 13	2 32	8 31	6 15	5 15	2 34	5 17	6 13	5 17	2 35
19	F	6 18	5 12	3 34	9 15	6 16	5 14	3 35	6 1	6 14	5 16	3 35
20	S	6 19	5 10	4 37	9 59	6 17	5 12	4 36	6 45	6 15	5 15	4 35
21	G	6 20	5 9	5 41	10 41	6 18	5 11	5 38	7 27	6 16	5 13	5 36
22	M	6 21	5 7	rises.	11 22	6 19	5 10	rises.	8 8	6 17	5 12	rises.
23	T	6 23	5 6	5 25	ev. 2	6 20	5 8	5 30	8 48	6 18	5 11	5 36
24	W	6 24	5 4	6 2	0 40	6 21	5 6	6 8	9 26	6 19	5 9	6 16
25	T	6 25	5 3	6 50	1 23	6 23	5 5	6 58	10 9	6 20	5 8	7 6
26	F	6 26	5 1	7 48	2 14	6 24	5 4	7 56	11 0	6 21	5 7	8 3
27	S	6 28	5 0	8 58	3 7	6 25	5 3	9 4	11 53	6 22	5 5	9 11
28	G	6 29	4 59	10 11	4 4	6 26	5 1	10 17	ev. 50	6 23	5 4	10 22
29	M	6 30	4 57	11 29	5 5	6 27	5 0	11 33	1 51	6 24	5 3	11 37
30	T	6 31	4 56	morn.	6 10	6 29	4 59	morn.	2 56	6 26	5 2	morn.
31	W	6 33	4 55	0 45	7 13	6 30	4 58	0 48	3 59	6 27	5 1	0 50

Peters, T. C., late of Darien, Genesee Co. Obituary. May 11, 1876
Rose of Sharon Short-Horns in America. Nov. 11, 25; Dec. 2, 1875
Riley, C. V., St. Louis, Mo. Eighth Entomological Report. July 13, 1876.
Rysdyk's Hambletonian. Obituary. April 6, 1876.
Sales of Short-Horns in 1875 compared with Preyious Years. Jan. 13, 1876.
Short-Horn Importations—by Fred. Wm Stone, Oct. 14, 1875; by J. H. Pickrell and J. H. Kissinger & Co., Oct. 28; by Cochrane, Beattie and others, Nov. 11, 1875; by Geo. Brown, May 18; by George Grant, June 15; by B. B. Groom & Son, June 22, 1876.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
NEW MOON, . . .	5	3 55 mo.	3 43 mo.	3 31 mo.	1	11 43 40
FIRST QUARTER,	12	7 0 ev.	6 48 ev.	6 36 ev.	9	11 44 0
FULL MOON, . . .	20	5 35 ev.	5 23 ev.	5 11 ev.	17	11 45 13
THIRD QUARTER,	27	5 22 ev.	5 10 ev.	4 58 ev.	25	11 47 18

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.						CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.						CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.					
		SUN RISES		SUN SETS.		MOON RISES.	H. W. BOST'N	SUN RISES		SUN SETS.		MOON RISES.	H. W. N. Y.	SUN RISES		SUN SETS.		MOON RISES.	
		H	M	H	M	H M	H M	H	M	H	M	H M	H M	H	M	H	M	H M	
1	T	6	34	4	53	2 1	8 10	6	31	4	56	2 2	4 56	6	28	5	0	2 3	
2	F	6	35	4	52	3 18	9 5	6	32	4	55	3 16	5 51	6	29	4	58	3 15	
3	S	6	36	4	51	4 33	10 0	6	33	4	54	4 31	6 46	6	30	4	57	4 29	
4	G	6	38	4	50	5 51	10 53	6	34	4	53	5 47	7 39	6	31	4	56	5 44	
5	M	6	39	4	48	sets.	11 42	6	36	4	52	sets.	8 28	6	32	4	55	sets.	
6	T	6	40	4	47	5 15	morn.	6	37	4	51	5 22	9 13	6	33	4	54	5 30	
7	W	6	42	4	46	6 5	0 27	6	38	4	50	6 12	9 57	6	34	4	53	6 19	
8	T	6	43	4	45	7 1	1 11	6	39	4	49	7 9	10 46	6	36	4	52	7 16	
9	F	6	44	4	44	8 5	2 0	6	41	4	48	8 11	11 30	6	37	4	51	8 19	
10	S	6	45	4	43	9 10	2 44	6	42	4	47	9 16	morn.	6	38	4	50	9 21	
11	G	6	47	4	42	10 15	3 36	6	43	4	46	10 19	0 22	6	39	4	50	10 24	
12	M	6	48	4	41	11 18	4 24	6	44	4	45	11 22	1 10	6	40	4	49	11 25	
13	T	6	49	4	40	morn.	5 13	6	45	4	44	morn.	1 59	6	41	4	48	morn.	
14	W	6	50	4	39	0 20	6 3	6	46	4	43	0 22	2 49	6	42	4	47	0 24	
15	T	6	51	4	38	1 22	6 52	6	47	4	42	1 22	3 38	6	43	4	46	1 23	
16	F	6	53	4	37	2 23	7 39	6	49	4	41	2 22	4 25	6	44	4	45	2 22	
17	S	6	54	4	36	3 26	8 26	6	50	4	40	3 24	5 12	6	46	4	45	3 23	
18	G	6	55	4	36	4 32	9 13	6	51	4	40	4 29	5 59	6	47	4	44	4 26	
19	M	6	57	4	35	5 42	10 2	6	52	4	39	5 37	6 48	6	48	4	43	5 31	
20	T	6	58	4	34	rises.	10 53	6	53	4	38	rises.	7 39	6	49	4	43	rises.	
21	W	6	59	4	33	4 45	11 42	6	55	4	38	4 52	8 28	6	50	4	42	4 58	
22	T	7	0	4	33	5 39	ev. 29	6	56	4	37	5 48	9 15	6	51	4	41	5 56	
23	F	7	2	4	32	6 48	1 15	6	57	4	37	6 55	10 1	6	52	4	41	7 2	
24	S	7	3	4	32	8 3	2 7	6	58	4	36	8 8	10 53	6	53	4	41	8 14	
25	G	7	4	4	31	9 20	2 58	6	59	4	36	9 25	11 44	6	54	4	40	9 29	
26	M	7	5	4	31	10 36	3 51	7	0	4	35	10 39	ev. 37	6	55	4	40	10 42	
27	T	7	6	4	30	11 51	4 45	7	1	4	35	11 52	1 31	6	56	4	40	11 54	
28	W	7	7	4	30	morn.	5 42	7	2	4	34	morn.	2 28	6	57	4	40	morn.	
29	T	7	8	4	29	1 3	6 40	7	3	4	34	1 4	3 26	6	58	4	40	1 4	
30	F	7	9	4	29	2 17	7 38	7	4	4	34	2 16	4 24	6	59	4	39	2 14	

Shepherd's Manual. By Henry Stewart. New-York: Orange Judd Co. March 30, 1876.
Short-Horn Exportations to England, by B. B Groom & Son. March 2, 1876.
Short-Horn Sale at Toronto (54 head average $1.693.50) June 22, 1876
Signal Service—Gen. Myers' Report of Operations. Oct. 28, 1875.
Smithfield Club Awards on Different Breeds for Forty-five Years. Jan. 6, 1876.
Sterling Strawberry introduced by G. H. Lodge, Cuyahoga Falls, Ohio. March 2, 1876.
Testimonial to a Prominent English Agriculturist. Jan. 6; May 25, 1876.
Tilden, Moses Y., New-Lebanon, N. Y. Obituary. Sept. 14, 1876.
Tobacco made of Paper in Havana. July 6, 1876.

12th MONTH. **DECEMBER, 1877.** 31 DAYS.

MOON'S PHASES.	D.	BOSTON. H. M.	NEW-YORK. H. M.	WASHINGT'N H. M.	SUN ON MERID. D.	H. M. S.
NEW MOON, . . .	4	5 20 ev.	5 8 ev.	4 56 ev.	1	11 49 24
FIRST QUARTER,	12	4 50 ev.	4 38 ev.	4 26 ev.	9	11 52 46
FULL MOON, . . .	20	7 7 mo.	6 55 mo.	6 43 mo.	17	11 56 35
THIRD QUARTER,	27	1 36 mo.	1 24 mo.	1 12 mo.	25	12 0 34

DAY OF MONTH.	DAY OF WEEK.	CALENDAR For Boston, New-England, New-York State, Michigan, Wisconsin, Iowa, and Oregon.				CALENDAR For New-York City, Philadelphia, Connecticut, N. Jersey, Penn., Ohio, Indiana and Illinois.				CALENDAR For Washington, Maryl'd, Virginia, Kent'ky, Miss'ri, and California.		
		SUN RISES	SUN SETS.	MOON RISES.	H. W. BOST'N	SUN RISES	SUN SETS.	MOON RISES.	H. W. N. Y.	SUN RISES	SUN SETS.	MOON RISES.
		H M	H M	H. M.	H M	H M	H M	H M	H M	H M	H M	H M
1	S	7 10	4 28	3 31	8 35	7 5	4 33	3 29	5 21	7 0	4 39	3 27
2	G	7 11	4 28	4 47	9 32	7 6	4 33	4 43	6 18	7 1	4 38	4 38
3	M	7 12	4 28	6 3	10 30	7 7	4 33	5 56	7 16	7 2	4 38	5 51
4	T	7 13	4 28	sets.	11 25	7 8	4 33	sets.	8 11	7 3	4 38	sets.
5	W	7 14	4 28	4 47	morn.	7 9	4 32	4 54	8 58	7 4	4 38	5 2
6	T	7 15	4 28	5 48	0 12	7 10	4 33	5 55	9 40	7 5	4 38	6 3
7	F	7 16	4 28	6 53	0 54	7 11	4 33	6 59	10 24	7 6	4 38	7 5
8	S	7 17	4 28	8 0	1 38	7 12	4 33	8 5	11 7	7 7	4 38	8 11
9	G	7 18	4 28	9 4	2 21	7 13	4 33	9 8	11 48	7 8	4 38	9 12
10	M	7 19	4 28	10 8	3 2	7 14	4 33	10 10	morn.	7 8	4 38	10 12
11	T	7 20	4 28	11 9	3 43	7 15	4 33	11 10	0 29	7 9	4 38	11 11
12	W	7 21	4 28	morn.	4 24	7 15	4 33	morn.	1 10	7 10	4 38	morn.
13	T	7 22	4 28	0 9	5 7	7 16	4 33	0 9	1 53	7 11	4 39	0 9
14	F	7 23	4 28	1 7	5 56	7 17	4 33	1 6	2 42	7 11	4 39	1 5
15	S	7 23	4 28	2 14	6 45	7 18	4 33	2 11	3 31	7 12	4 39	2 9
16	G	7 24	4 28	3 21	7 38	7 18	4 34	3 17	4 24	7 13	4 39	3 13
17	M	7 24	4 29	4 30	8 31	7 19	4 34	4 25	5 17	7 13	4 40	4 20
18	T	7 25	4 29	5 41	9 30	7 20	4 35	5 34	6 16	7 14	4 40	5 27
19	W	7 26	4 30	6 50	10 30	7 20	4 35	6 43	7 16	7 15	4 41	6 36
20	T	7 26	4 30	rises.	11 31	7 21	4 36	rises.	8 17	7 15	4 41	rises.
21	F	7 27	4 31	5 45	ev. 20	7 21	4 36	5 52	9 6	7 16	4 42	5 58
22	S	7 27	4 31	7 4	1 5	7 22	4 37	7 10	9 51	7 16	5 42	7 15
23	G	7 28	4 32	8 26	1 54	7 22	4 37	8 29	10 40	7 17	4 43	8 31
24	M	7 28	4 32	9 41	2 26	7 23	4 38	9 43	11 12	7 17	4 43	9 45
25	T	7 28	4 33	10 56	3 29	7 23	4 38	10 57	ev. 15	7 17	4 44	10 57
26	W	7 29	4 34	morn.	4 18	7 23	4 39	morn.	1 4	7 18	4 44	morn.
27	T	7 29	4 34	0 9	5 9	7 24	4 39	0 8	1 55	7 18	4 45	0 7
28	F	7 29	4 35	1 22	6 11	7 24	4 40	1 19	2 57	7 18	4 46	1 17
29	S	7 30	4 36	2 36	7 10	7 24	4 41	2 31	3 56	7 19	4 47	2 27
30	G	7 30	4 36	3 50	8 11	7 24	4 42	3 45	4 57	7 19	4 47	3 39
31	M	7 30	4 37	5 1	9 13	7 24	4 43	4 55	5 59	7 19	4 48	4 49

Trotting Horses in 1875—Table of Winners and their Time. Feb. 24, 1876.
Van Houtte, Louis, Ghent, Belgium. Obituary. June 8, 1876.
Veterinary Medical Association Organized in Canada. Feb. 3, 1876.
Villas and Cottages. By W. M. Woollett. New-York: Orange Judd Co. May 18, 1876.
Vineyards in Ohio—Area and Product for Ten Years. Feb. 3, 1876.
Warren, Joseph, Buffalo, N. Y. Obituary. Oct. 5, 1876.
Wisconsin Horticultural and Agricultural Society Transactions. Aug. 24, 1876.
Wool Growers' Association and Show at Canandaigua, N. Y. March 16; May 11, 1876.

THE

ILLUSTRATED ANNUAL REGISTER

OF

RURAL AFFAIRS.

ORNAMENTAL PLANTING.

IT IS NEEDLESS at the present day to go into an argument to show that ornamental planting should engage the attention, and be adopted in practice by every resident in the country. The added market value which it imparts to every place is an inferior reason ; the attractions which it throws around the homes of young people are far more important, and they may prove the turning influence in their future lives.

In this country, where nearly every landowner has but moderate means, it is necessary to adopt economical methods for reaching the desired object. Costly plantations can be owned by very few. These pages will be devoted to suggestions for those who can afford but moderate outlay ; and while the work should be thoroughly done, it will be a leading object to make the money at the owner's command go as far as possible.

It is common to plant a few ornamental trees around the dwellings of farmers, with very little preparation of the ground beforehand, or care of it

afterwards. Grounds may be planted and kept in this manner as cheaply as any one could desire, but it is not our present object to speak of these imperfect attempts at ornamental planting, but of such grounds as are well and thoroughly prepared, well planted, and kept in good subsequent order. For small or village lots, no half-way management will satisfy those who are favored with good taste, even with limited means.

Laying Out the Grounds.

The first thing requiring attention is to form a plan of the whole grounds. If the dwelling is not erected, its position must be fixed. If the house is already built, the surroundings are to be determined. This may be done in part while draining and preparing the ground are going on, or before. The easiest way is to measure and map the whole; and then to lay out the roads and walks, the ornamental and vegetable garden, and the places for planting the trees. Here will be a large scope for the exercise of the ingenuity and taste—a subject so extensive that we have space only for general rules.

If the house has not yet been built, it will be a matter of economy to strip off all the surface soil where it is to stand, and cart it to the intended spot for the kitchen garden, and thus secure its fertility. To prevent treading and hardening the ground by builders and their teams, it is best to lay out the road and most frequented footpaths before the work is begun, and to finish them substantially with broken stone and gravel. Draining and grading may be done after the buildings are finished.

Those who have given but imperfect attention to landscape gardening, may be assisted at the outset in laying out their grounds, by the observance of

Some General Rules.

1. Winds.—Shelter from prevailing winds is an important object, and in arranging the plan of the grounds, masses or belts of evergreens or thick deciduous trees should be placed where they will break the force of the stronger or prevalent winds, when this does not interfere with more important ends.

2. Distant Views.—Another essential object is to preserve distant and pleasing views beyond the grounds, as seen from the dwelling or its vicinity. A lake, a picturesque valley, distant hills, a steeple or village, should never be excluded from the sight. Trees should not be planted at those points. Low shrubs may take their place if the view can be seen over their tops when fully grown.

Unpleasing objects, on the other hand, should be carefully shut out by dense planting—such as a rough building, a sawmill, or adjacent grounds kept in a shabby manner.

3. Expense will be avoided by adapting the design to the character of the ground. If this is already flat and even, it may be laid out at will; but if undulating or marked with hills or valleys, or cut with gorges, heavy

grading should not be attempted, but only the moderate rounding of asperities. Great advantages may be taken of the undulations for increasing the beauty and variety of the place, and a great deal comprised within a moderate extent of ground. The remote portions, especially if naturally or artificially planted with irregular trees, undergrowth and climbers, with natural rock-work, will require little attention afterwards, other than keeping in order the gravel walk which reaches them.

4. PLANS.—It is important on the score of economy to have the plan of the grounds perfectly digested beforehand. Otherwise, when the work is partly finished, alterations may be found necessary, and before all is completed it will be liable to become incongruous and unsatisfactory, and the whole will be more expensive than a regular and unchanged completion of the whole.

5. WALKS.—Another way to avoid expense is to have as few walks as may be admissible. If well made, they are costly; and they require a continued outlay to keep them in order. A single walk kept in perfect order is better than many, more or less neglected.

6. BOUNDARIES.—The boundaries of any place, especially if otherwise distinct and glaring, should be hidden by foliage. This will also increase the apparent limits of the grounds. Irregular belts, largely of evergreens, as in fig. 166, will usually accomplish this object.

Fig. 166.
Irregular Belt at Boundary.

7. Apparent breadth of ground is increased when a continuous green color is preserved between trees and lawn. When trees which flank the lawn are chiefly evergreens, the branches should sweep the grass.

8. The more irregular the ground, and the greater the variety in plan and outline, the greater will be its apparent dimensions. On the contrary, a flat surface, laid out in a formal or geometric style, will always appear smaller than it really is.

9. On small places, plant no trees which grow to large size, and which will overshade smaller trees and plants. Evergreens may be pinched and shortened back, and kept within bounds, but this essential care is apt to be neglected.

HARMONY AND VARIETY.—The skill of the landscape gardener is shown in combining these two qualities. A common mistake is the attempt to introduce too many objects; to crowd within a confined space the adornments of the most ample grounds. Simplicity, finish and perfection, are incomparably better than an incomplete jumble. Incongruity is often seen in the structures. A Grecian house has a gothic barn; a Grecian residence has a rustic summer-house in front; a conical pile of stones, meant

to imitate the massive rock-work of the tangled ravine, is placed in a formal garden; the wild and irregular forms of climbers are placed along with sculptured figures and vases.

Details of Operations at Beginning.

When new ground is occupied for building, the first thing to be done is to drain it thoroughly. This, of course, will not be necessary if, as rarely happens, it has a perfect natural drainage, so that water will not remain a day in post-holes at the wettest season of the year. The drains should be deeper and nearer together than for farm fields—not less than 3 feet deep, and not farther apart than 20 feet. The next operation is manuring all the ground except where buildings are to stand, breaking the manure up finely and mixing it thoroughly by means of the harrow and plow. When these two operations are performed, the whole may be made smooth and laid out, and seeding the lawn and planting trees may be commenced.

The question is often asked, what will be the expense of thus preparing and planting a lot of given size with a creditable finish? Much will depend on the previous condition of the ground, facilities for procuring stone and gravel, and various other circumstances and surroundings. In order to enable any owner to make the estimate for himself, we will give two examples of the cheapest and the more expensive preparation and planting. The cheapest is where the ground has already a natural drainage, has a smooth and even surface, and is in good condition as to fertility. A moderate amount of manure will be sufficient to start with; the only grading will be plowing and thorough harrowing, with slight work in leveling small asperities by hand. The following expenditure will be required for an acre:

Plowing four times and subsoiling once,	$15.00
Harrowing eight times,	5.00
Twenty 2-horse loads manure, and spreading,	40.00
Stone and gravel road, 100 feet,	50.00
Gravel walks, say 200 feet,	20.00
Fruit trees, small fruits, &c.,	20.00
Planting them,	10.00
Ornamental trees and shrubs,	50.00
Planting these,	20.00
Cost per acre,	$230.00

Every owner, on looking over this list, will make material alterations. Some items will appear too small and others too large. Nearness or distance to stone and gravel for the carriage road will greatly influence the cost of procuring them. The cost of fruit trees and ornamentals will vary much in different localities, and with the common or rarer sorts. Manure will often cost double the preceding estimate, drawn and spread. The total amount will even here be larger than many novices will expect; but to do the work well and creditably, at once, will require all that is given in the estimate.

The following figures are intended to apply to grounds where thorough drainage will be required, with strong manuring, grading the surface,

purchasing and carting rich loam for the surface soil on sterile ground, and buying high priced trees and plants. By grading is not meant reducing the whole to a perfect level, but smoothing and rounding the sharp knolls and hollows, by reducing the one 6 inches to a foot, and filling the other to an equal depth (fig. 167). Much of this may be done with plow, scraper and harrow.

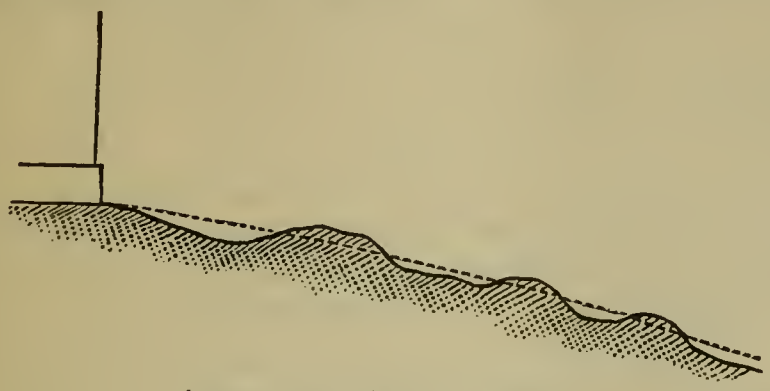


Fig. 167.—*Grading the Surface.*

Draining one acre, 125 rods,	$60.00
Plowing, subsoiling and harrowing,	20.00
Forty loads manure, drawing and spreading,	160.00
Grading (extremely varying,)	30.00
Road and walks,	80.00
Trees and shrubs, fruit and ornamental,	100.00
Planting and smoothing,	50.00
Carting top soil and muck for dressing surface, say 100 cubic yards,	200.00
Total,	$700.00

Maintaining Grounds.

The cost of keeping grounds in order, per acre, will vary greatly with their finish. The farmer whose home grounds are planted with large shade trees, as oaks and maples, may, if he has no small shrubbery nor flower beds, have all the work done by a flock of sheep, which will keep the grass cropped short the season through. If he has a common earth road only, he will expend little in keeping it in order. If, however, he desires a more finished place, still cropped by sheep, a handsome, well-made carriage way kept in good order, will greatly add to the appearance, which will be still more improved by finished gravel walks. To keep these well they will need occasional weeding, cleaning and rolling, which should be done several times in the year, varying with the dryness of the season and other causes. To keep a carriage road in the best condition will cost for the year from half a dollar to a dollar a foot in length. A foot-walk will need about half as much labor per running foot.

If the place contains shrubbery and flower beds, the lawn must be cut by means of a lawn mower. The practice of allowing the grass to grow to be cut for hay can hardly be tolerated with any claim to taste. A compromise between a tall meadow and a smooth shaven lawn, by allowing the grass to grow half a foot or more in height, to be mowed occasionally by a hand scythe or a common mowing machine, may be better, but if cut by a lawn mowing machine, it will be most economical to go over the surface as often as every five days when the grass is growing rapidly, or

less frequently as the summer advances, and in early autumn. This will give a beautiful green carpet, like velvet, to tread on. The estimates per acre will therefore be nearly according to the following figures :

Twenty rods of carriage drive, average say,	$15.00
Twenty rods of foot-walks do.	7.50
Incidentals,	5.00
Annual cost per acre of sheep-grazed grounds,	$27.50

The farmer, therefore, who has four or five acres devoted to ornamental shade grounds about his house and other buildings, should be willing to devote a hundred dollars annually to keeping them in good order.

If he cuts the grass down to a velvet carpet with a lawn mower, he will add to this cost. If the grounds do not exceed an acre, he will find it most economical to use a hand lawn mower ; if three or four acres, a horse must be employed. (The scythe should be discarded, as being imperfect, costly and laborious.) One man will easily go over an acre a day with a lawn mower, which should be used at least fifteen times during the season, costing about $22, to be added to the former estimate, and nearly doubling it. Additional walks, and the care of flower beds, will increase the expense a few more dollars, varying with their extent. The annual cost, therefore, for neat and finished ornamental grounds, interspersed with shrubs and flowers, may be put down at from $50 to $60 per acre.

When the grounds are reduced from an acre to a half or quarter acre lot, and only half of this is devoted to ornamentals, it will be seen that the expense and trouble of keeping them in order is quite small, or about $15 for a quarter acre, or $8 to $10 for the eighth of an acre on the quarter-acre lot.

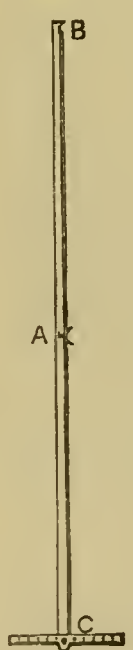


Fig. 168.
Pole for Laying Curves.

Details in Laying Out.

In laying out the curves of roads, walks and flower beds, we have found the pole represented in fig. 168 a ready and accurate instrument. On large grounds it may be 10 or 12 feet long, and on smaller from 4 to 6 feet ; while a still shorter rod, about 2 feet long, may be conveniently employed in making the short curves in beds. It has an iron pin a few inches long fixed at the centre, *A*, for penetrating the surface of the ground ; opposite to this pin is a small iron open socket for receiving the marking stake ; and at *C* is a small graduated cross-bar.

Now, in using this rod, if it is laid on the ground, and stakes are inserted at *C*, *A* and *B*, and then the rod is moved forward half its length, without deviating to the right or left, it will make a continuous straight line ; but if it is moved on the centre pin, so as to deviate to the right or left at each forward movement, it will make a continuously curved line. The greater the deviation at each move, the shorter will be the curve. The following is

the manner of using it: It is first placed on the ground in the direction for starting the road or walk, and the pin at the centre is slightly pushed into the soil. Small stakes are then inserted into the ground at *C*, *A* and *B*. The rod is then taken up and moved half its length forward, placing the centre pin close alongside the third stake. The rear end is then moved a certain distance, measured on its scale, to the right or left as may be required, which will cause the forward end to deviate an equal distance from the straight line. The continuous curve (fig. 169) is thus readily formed, which may be made sharp or long by measuring a greater or less distance on the scale. A short curve may be made to run gradually into a longer one, or vice versa, by a regular increase or decrease on the scale at each movement of the pole.

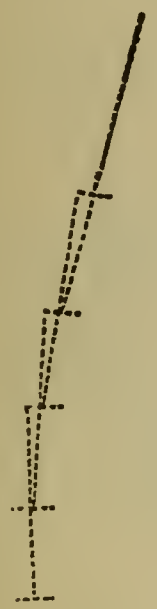


Fig. 169. *Curved Line for Walk.*

This simple instrument will not only enable the operator to lay out curves rapidly, but to do it with greater accuracy than by the common mode of using a rod without a scale, guessing the distance with the eye. A circle may be thus laid out if the deviation is uniform, and the work is carefully performed; or an oval or other figure made by varying the departure as may be required.

A ready mode of restoring with accuracy the outlines of circular beds is shown in figure 11, p. 28, vol. VII of RURAL AFFAIRS; and some modes are there given for constructing more complex figures. But with a short rod, say 2 feet long, all these curves may be made in the manner described. In using the long pole for laying out the long curves of roads, the work can be done by the assistance of a boy to set the forward stakes, but with a short rod the operator will work rapidly without help. The stakes may be of wood, about half an inch in diameter and six or eight inches long, but on extensive grounds they may be larger.

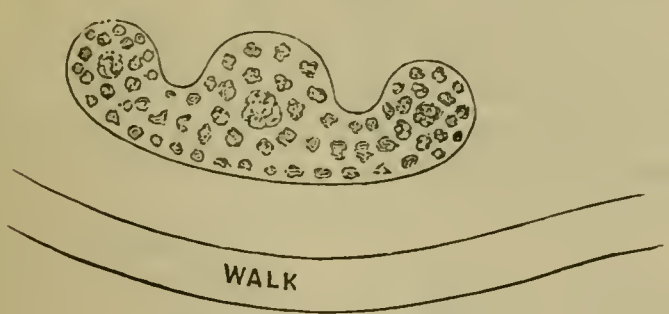


Fig. 170.—*Flower Bed.*

We have given the directions somewhat in detail, as owners who have not the services of a skillful landscape gardener at hand, are often puzzled to proceed, and awkward curves are the result.

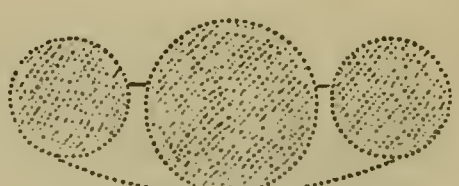


Fig. 171.—*Mode of Forming.*

Irregular beds for flowers may be made as in fig. 170, by drawing circles and joining them, fig. 171 showing the manner in which this is done, and fig. 170

the same finished and planted. Arabesque beds, represented in fig. 172, flanking the curved walk, require an accurate eye for designing them in the best manner; but a graceful and curved outline may be preserved by the use of a rope, the mode of working with which we here describe:

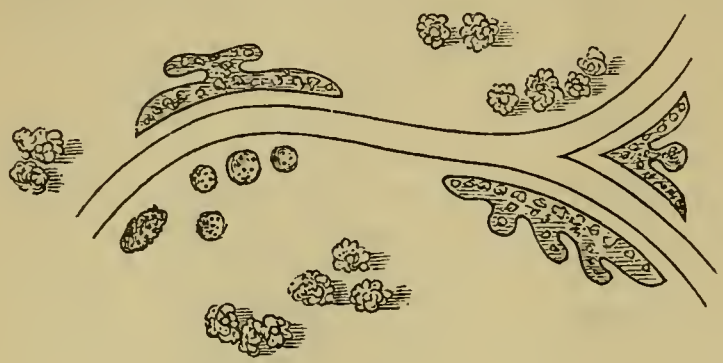


Fig. 172.—*Arabesque Beds.*

If small figures are to be laid out, the rope may be of moderate size, so as to make short curves; for large figures a larger and stiffer rope may be used. The operator places it upon the ground, and forms with it the outline of the proposed figure (fig. 173.) Then, before beginning work, insert a few

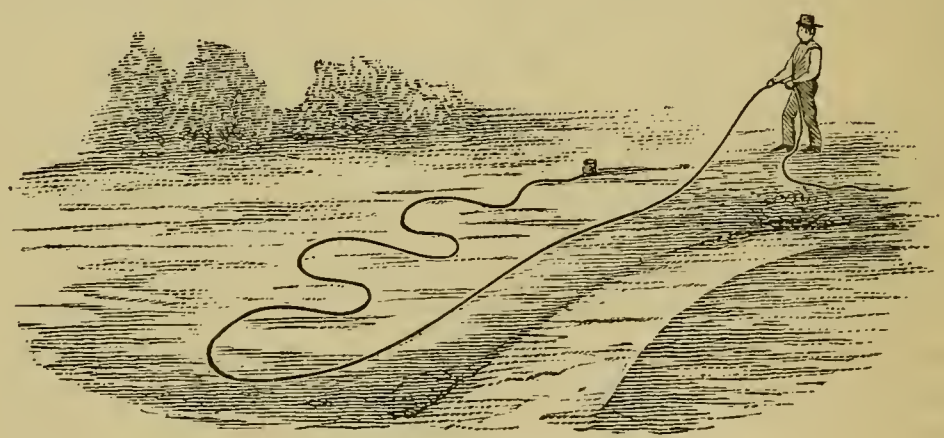


Fig. 173.—*Laying Out with Rope.*

small pegs or stakes barely touching it. These will keep it at its place while the sharp spade is inserted all along its side in cutting out the bed.

On very small pieces of ground, a rope will assist in laying it out, without the use of the rod already described; and on larger grounds, where the roads and walks have been already staked, a stiff rope placed along in contact with them will enable the workman to make a perfect curve with the spade.

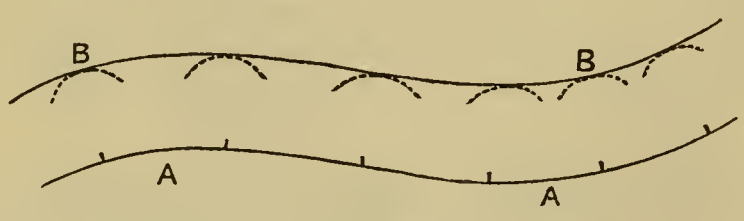


Fig. 174.—*Parallel Lines for Road.*

It is important to make the two sides of a curved drive parallel. An easy and rapid mode is first to lay out and stake one side, *A A*, fig. 174, and then place a rope parallel with this, *B B*, as nearly as can be readily done with the eye. Then take a pole of a length equal to the intended breadth of the road, and placing one end against each stake

successively, sweep the other end backwards and forwards against the rope, as shown by the dotted curves, which will place it precisely where it is wanted.

Laying Out Flower Beds.

For a large central flower bed, or one to be occupied with small shrubbery, a less formal and more ornamental outline may be given, as seen in

Fig. 175..—*Centre Flower Bed.*

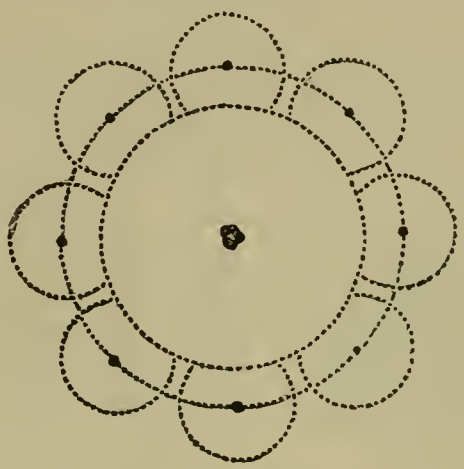


Fig. 176.—*Laying Out the Same.*

fig. 175. This bed is easily laid out by describing two concentric circles, as in fig. 176, and then making several smaller ones on the outer one.

Fig. 177.—*Symmetrical Beds.*

When a flower garden of some extent is desired on a lawn in the more finished part of the grounds, that the whole may be seen at a birdseye view, a handsome effect is produced by such a symmetrical arrangement as in fig. 177, the dark figures being the beds, and the white space the lawn. A simpler form is shown in fig. 178. An important advantage in such designs is the facility with which additional beds may be made, or the number reduced.

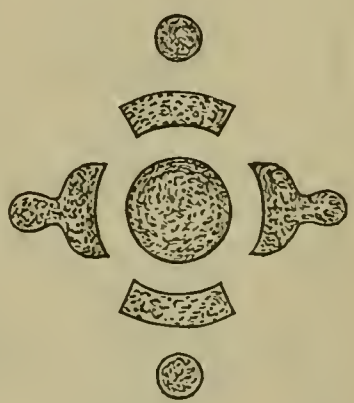


Fig. 178.—*Symmetrical Beds.*

Designs for Small Grounds.

The accompanying plan, fig. 179, represents a village lot or equivalent space in the country, about four rods wide and eight long, containing one-fifth of an acre. By placing the dwelling at one side, a greater breadth of grass is secured, which is planted with a few shrubs, and one irregular and three circular flower beds are in front of the entrance to the house.

A small kitchen garden, worked with the spade, is at the rear. A little labor mornings and evenings will keep such a snug place in perfect order.

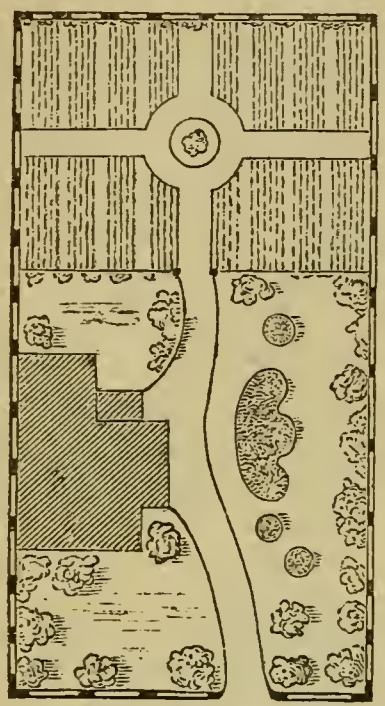


Fig. 179.—*Small Village Lot.*

Fig. 180 is a lot one-quarter larger, laid out so as to cover nearly the whole surface with fruit and at the same time secure some ornamental effect. The house is placed quite near the front entrance, to allow space at the rear for fruit trees and small fruits. Flower beds—one circular and three elliptical—

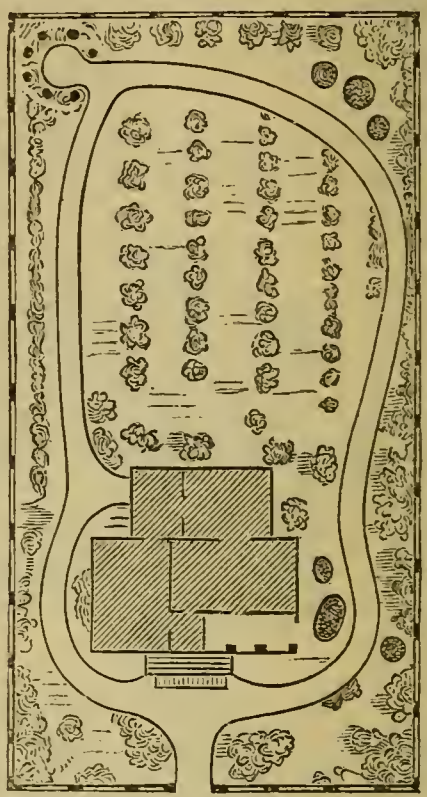


Fig. 180.—*Village Fruit Lot.*

are then placed at one side, three near the rear line, and a few small trees or shrubs in the front and rear. The rest of the grounds, except at the boundary and near the dwelling, is planted with fruit, which may be of some dwarf pears and apples, but mostly with currants, gooseberries, blackberries. raspberries, strawberries, &c., with a line of grapes on the left. A shaded seat at the left rear corner adds to the interest of the place. Properly planted and managed, such a lot as this would afford an opportunity for much skill in fruit raising, and it might be made an attractive home; while the vegetables between the rows of small fruits would contribute to the support and comfort of the family.

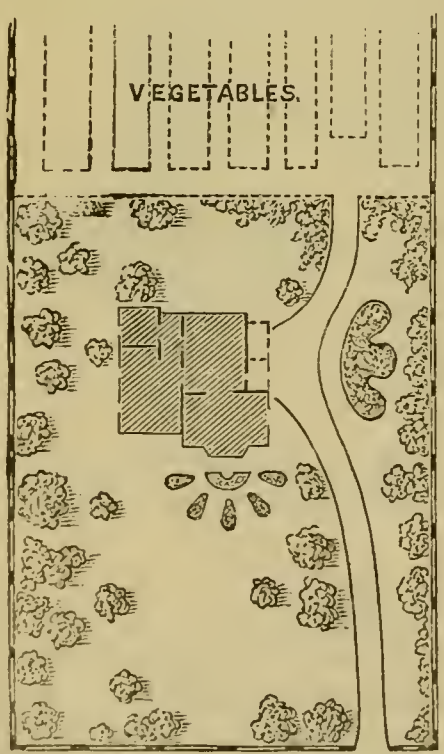


Fig. 181.—*Ornamental Village Lot.*

Fig. 181 is the plan for a quarter-acre lot, or larger, where the leading object is to have as much ornamental breadth as practicable. The walk, passing up near one side, gives a lawn at the centre. Flower beds for bedding plants of low growth and brilliant appearance are placed

in front of the bay-window, and a larger arabesque bed at the side may be occupied with larger plants or small shrubs. The single walk requires less labor to keep in order, and the whole may be kept in finished condition at moderate expense.

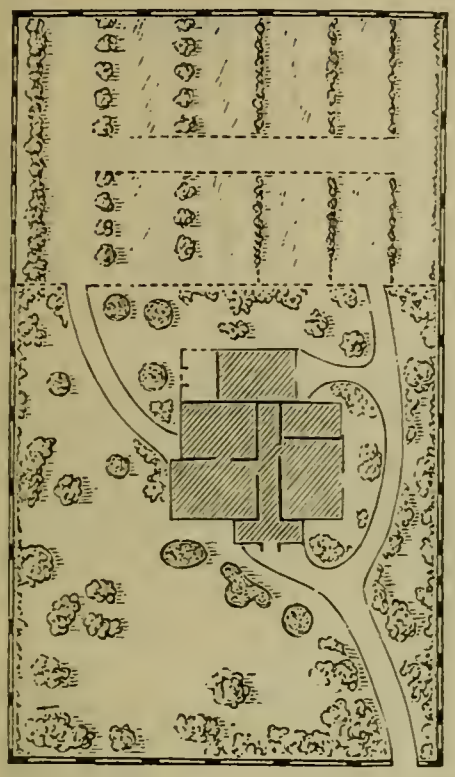


Fig. 182.—*Complete Village Lot.*

Fig. 182 is another plan of a lot of about the same size, possessing more conveniences from its walks, and having more space for vegetable garden, planted between the lines of small fruits and grapes.

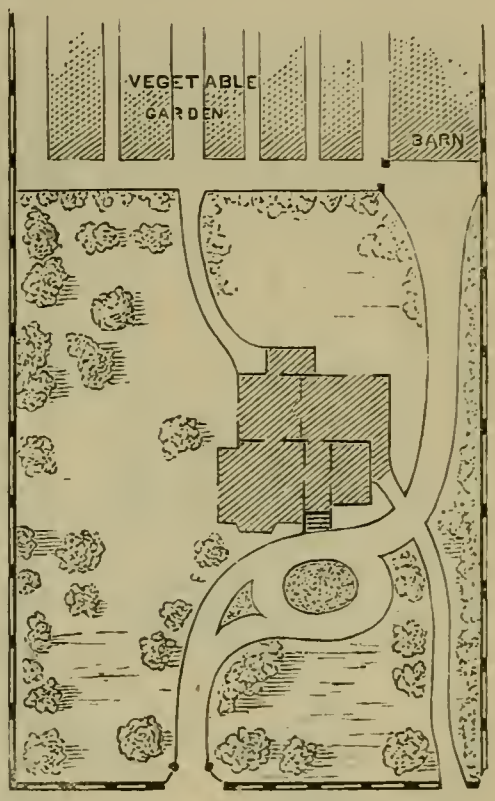


Fig. 183.—*Dwelling with Carriage Conveniences.*

Dwellings with Small Barns.

A lot somewhat larger in size than any of the preceding, is represented by fig. 183. The carriage road is distinguished in the plan by its greater width. A separate entrance is provided for the foot-walk. Carriages may be turned in front of the house, or in the area at the barn. The manure is easily conveyed to the adjacent garden.

Fig. 184 is a plan of grounds of from one to two acres, where less space is to be occupied with ornamentals, or more with fruit and vegetables. More than one-half, towards the rear, is planted with rows of dwarfs and the smaller fruits, namely, a line of grapes on the left, then three rows of currants, gooseberries and raspberries, a row of dwarf pears, another of dwarf apples, and peach trees at the rear of the barn. A variation of this arrangement would be to plant dwarf plums in place of one row of the small fruits. Between these rows of fruits ample space is allowed for garden vegetables, the arrangement of this garden admitting of free cultivation with a horse, and thus saving three-fourths the labor otherwise

required by hand. On the left of the dwelling, and in front of this garden, cherry trees of the smaller sorts are planted in quincunx form. These may consist of the large Morello, May Duke, Belle Magnifique, and Early Richmond. Cherry trees do not require high culture, and for this reason they may be placed at one corner of the lawn.

Of the front portion, very little is occupied with the road and walk, and the expense of constructing and maintaining these is therefore comparatively small. As the carriage road, however, serves the purpose of a foot-walk to the public road, it should be neatly made, and kept in good order. The broad gravel yard in front of the barn serves as a carriage turn, the centre being occupied with a pump, or fountain and tank.

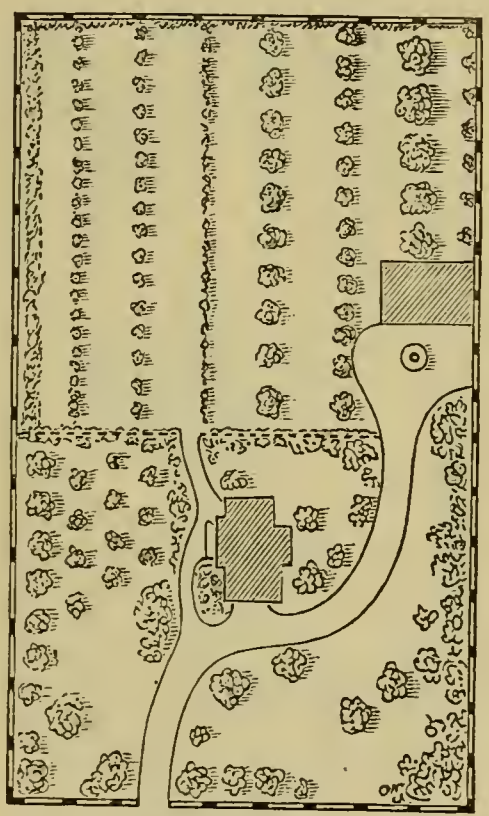


Fig. 184.—*Large Fruit Lot.*

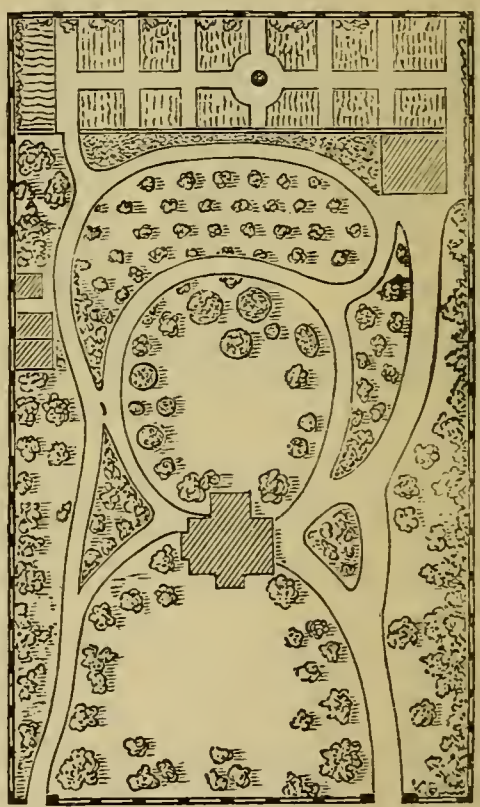


Fig. 185.—*Finished Ornamental Grounds.*

Fig. 185 is a plan intended for grounds varying from one to two acres, and it may be adopted for a large suburban or village residence, or for a farm, the owner of which can afford some expenditure to keep his home in finished order. If for the latter, the farm road will be placed to the right or left of the plan as here represented, and just without its boundaries, and the kitchen garden in the rear will be much larger, and be so arranged as to be cultivated by a horse.

The leading object of the plan is to place the dwelling in a central position, and to surround it with ornamental trees and shrubs bordering the lawn in front, and at the sides, with a flower garden and dwarf fruit trees at the rear. The carriage road at the right is distinguished in the plan from the foot-walks by its greater width. The entrance to the dwelling

being at the side, greater breadth and a clearer view of the lawn are given in front. A carriage turn is afforded on the right. Space between the carriage-house and the boundary admits a cart with manure to the kitchen garden. The flower garden at the rear of the dwelling consists mostly of circular beds cut in the smooth turf, this shape admitting of a more easy preservation of the outline, while at the same time the distribution of these beds may give any degree of freedom and variety. Immediately in the rear of the flower garden, the dwarf fruit trees are planted in quincunx form, and they may consist of dwarf apples on the Paradise stock, or of such dwarf pears as grow with greatest vigor on the quince, as the Duchesse d'Angouleme, Louise Bonne of Jersey, Doyenne Boussock and Beurre Superfin. The dwarf apples may be summer and autumn varieties of any selected sorts, and they will give a succession for family or table use at these times of the year. Between the dwarf trees and the kitchen garden is a trellis of grapes. The rear of the kitchen garden is planted with raspberries. The sides and rear boundaries are well flanked with irregular plantings of ornamental trees and shrubs.

Ornaments for the Lawn.

Fig. 186 represents a post for a rustic flower pot containing plants in bloom. It consists of a thick, round cedar post, with the bark on, (which will adhere if cut while dormant,) and after setting it is decorated with rustic work made from short, round sticks halved and nailed to the post. These should also have the bark adhering. When finished, all this added work should be heavily soaked with crude petroleum, applied with a large brush, which will improve the color, and make the whole many times more durable. The flower pot may be a wooden box with rustic mosaic, or it may be a common earthen pot, with a lattice frame made to fit it when set in.

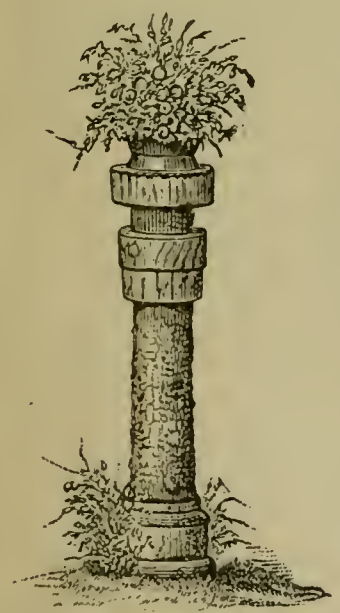


Fig. 186.—*Rustic Post for Flowers.*

Fig. 187 is a post for a dial. It may be either a rough or smooth post, of durable wood. sawed off level at the top for the reception of the dial. It may be ornamented with any slender climber, as a Cypress vine, Akebia, Periploca, or Aristolochia, but should not be covered so as to hide the post, as a trailing plant should be used only for ornamenting, but not concealing the object which supports it.

Fig. 187.—*Dial Post Ornamented with Climbers.*

PRACTICAL VENTILATION.

THE ATMOSPHERE, on which all breathing animals depend for their existence, surrounds the globe and extends about forty-five miles upwards. It may therefore be regarded as a shoreless ocean of air. From its great elasticity it is heaviest at the earth's surface, the superincumbent mass pressing the lower portion into narrower space. If as heavy above as at sea level, it would be only five miles high. Its lightness increases so much upwards that one-half its whole weight is within three miles of the earth.

The atmospheric air, at the earth's surface, is about 780 times lighter than water. From its bulk and lightness, it is tossed about and swept into currents through the action of heat and other influences, producing breezes, winds and tempests. A cubic foot weighs only 1¼ ounces at 32° Fah.; yet so great is its whole mass as to have a weight equal to a stratum of cast-iron 4 feet thick over the whole earth. The weight of the entire atmosphere is equal to that of 150,000 cubic miles of solid cast-iron.

Composition of Air.

Air is composed of about 21 per cent. of oxygen and 79 per cent. of nitrogen, in addition to which, ten thousand parts contain about four parts of carbonic gas, as shown in the relative areas of the circles, fig. 188. The proportion of this gas varies slightly, as for example, over lakes there is a little less and in cities slightly more, (never six parts in ten thousand) and it is also slightly diminished by rains; but still the variation from 4 parts in 10,000 is quite small. On the top of high mountains and at great heights reached by balloons, the same proportions are found to exist. This great uniformity is doubtless owing to the remarkable tendency of all gases to intermix thoroughly with each other, a striking illustration of which is shown by connecting two glass bottles, one above the other, by a long and slender tube, (fig. 189,) and filling the upper with hydrogen and the lower with oxygen, the former being sixteen

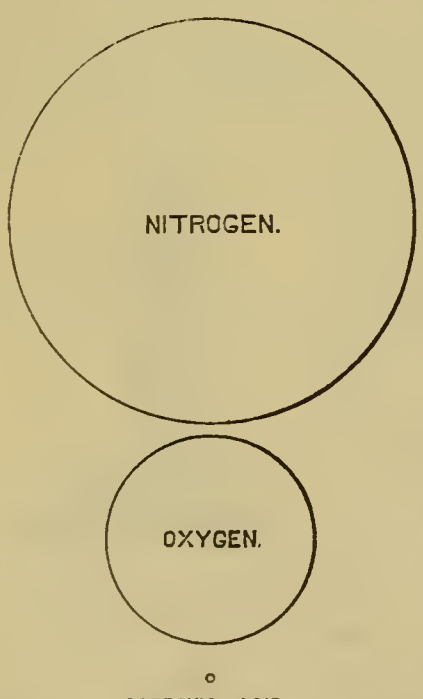


Fig. 188.—*Comparative Volumes of the three Gases.*

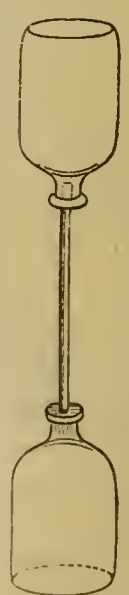


Fig. 189. *How Gases mix.*

times lighter than the latter. In a few hours the gases are found to be equally diffused through both vessels. This tendency to intermix causes the excess of the carbonic acid gas produced in close rooms by breathing and from lamps, to become equally diffused in a short time through the upper and lower portions of apartments, and analysis of air at the ceiling and at the floor shows scarcely any difference in the composition.

POISONOUS AIR.—Pure carbonic acid is a deadly poison when breathed, and air largely mixed with it is fatal to animals. But the small portion (one part in twenty-five hundred of common air) exerts no deleterious influence, nor is any bad effect observed when the proportion is doubled. It is therefore regarded as safe to breathe air containing not over eight parts in ten thousand. But a much larger portion often exists in close rooms filled with people. For it has been ascertained in many ways, that the air thrown out of the lungs in breathing contains about one hundred times as much carbonic acid as the air of the atmosphere. Instead of only four parts of this gas in ten thousand, as in pure air, the air from the lungs contains about four hundred parts in ten thousand. If therefore a person continues to breathe in a confined room, he rapidly increases the amount of carbonic acid, and thus renders the air more or less poisonous. It has been found that in lecture rooms, meeting houses and schools, after being crowded for an hour or two, and where adequate ventilation has not been provided, the carbonic acid is often equal to thirty parts in ten thousand, and sometimes as great as fifty or sixty parts. This is a principal cause of the frequent headaches in large schools, and is always highly detrimental to health.

EFFECTS OF BAD VENTILATION.

L. H. Leeds quotes from a report to Congress on this subject, from which it appears that the air in many sleeping rooms in the morning has been found to contain from forty-eight to fifty-two parts of carbonic acid in ten thousand; school-rooms, thirty to fifty-six; hospitals, thirty to forty-three; beer saloons, forty-nine; lecture rooms, from thirty-two to sixty-seven; and in a compactly filled school room in one case, seventy-two parts. When the exposure to such a mass of poison is only occasional or accidental, continued breathing of fresh, pure air afterwards may effect a restoration from its effects; but where it is continued day after day, as in school-rooms, and night after night, as in domitories, the results are always more or less serious.

In Philadelphia, one of the healthiest large cities in the Union, statistics have shown that 40 per cent. of all the deaths may be traced to the effects of foul air, which would be 6,800 deaths in the city from this cause in one year. Physicians estimate twenty-five to thirty days sickness to each occurrence of death, which would give about two hundred thousand days of sickness annually in Philadelphia resulting from a want of proper ventilation—see Leed's Lectures. The pecuniary loss may be estimated; the

pain and anxiety cannot. Many millions in money are yearly wasted in the United States from a want of information, to say nothing of the value of the many thousand human lives.

The trouble is not confined to cities; throughout the whole country pale faces and feeble health, deaths among children, and consumption among adults, are a fruitful result of close rooms and bad air. Daniel Leach, Superintendent of Schools at Providence, R. I., says: "I have given much attention to the subject for more than twenty years, and I firmly believe, from careful observation, that very many cases of consumption, heart disease, and kindred maladies, have had their origin in the foul air that is breathed in school rooms and other crowded places." Dr. Kedzie examined the air of thirty school-houses in different parts of Michigan, and found in many of them an amount of carbonic acid between thirty and forty parts in ten thousand, and in these schools headaches, catarrhs, cold feet, lassitude and other results were either very common or almost universal. In some instances where improved modes were adopted to supply air from without, these troubles were at once lessened or removed.

How Air is Vitiated.

The amount of air breathed by any person in a given time, varies with circumstances. For instance, when walking slowly he breathes twice as much air as when lying down or sitting; when walking at the rate of about three miles an hour, he breathes three times as much, and when swimming he breathes four times as much. The average, however, under all circumstances, is about twenty-four cubic inches at each breath; and the average number of respirations per minute about twenty. He would breathe four hundred and eighty cubic inches in a minute, or a cubic foot in three and a half minutes. This would be four hundred cubic feet in twenty-four hours, or enough to fill a room ten feet square to a depth of four feet. Every active adult person breathes about thirty pounds of air in each twenty-four hours.

But for healthy respiration he will need at least fifty times as much air, or twenty thousand cubic feet, or enough to fill eighteen rooms ten feet square and ten feet deep. The reason of this is that all the air which he throws out by breathing has about one hundred times as much carbonic acid as the pure air of the atmosphere which he takes in. Thus pure air, as already stated, has only four parts of carbonic acid in ten thousand; while the expired air from the lungs has about four hundred parts of carbonic acid in ten thousand, and consequently it needs to be very largely diluted with pure air. If we had to breathe the same air over again, without any admixture of unbreathed air, we could live but a short time in an atmosphere so fatally charged with poison.

There are other deleterious matters in breathed air, but they may be generally estimated as nearly equal in measure to the carbonic acid, which

is commonly accepted as a fair index to the proportion of other accompanying impurities.

The amount of carbon thrown out daily in breathing by an adult person is rarely appreciated. It amounts to more than a quarter of a pound, and if separated from the oxygen with which it is combined, would constitute this amount in lampblack. Thus every healthy and active man yearly discharges from his lungs in expired breath about 100 pounds of lampblack in a state of combination.

Aggregate Amount in the Atmosphere.

It will be an interesting calculation to ascertain how much carbonic acid gas is thrown into the air every year by all the persons, animals and fires of the whole globe, allowing for the animals and fires seven times the amount made by the breathing of the thousand millions of human beings. The latter breathe out 3,000,000,000 tons of carbonic acid gas in a year, and animals and fires produce 21,000,000,000 tons more—equal to 24,000,000,000 tons in all. Looking at this immense mass, it would seem at first glance that the whole atmosphere must become speedily filled with poison. But a careful calculation will show that there are no less than 2,000,000,000,000 tons of carbonic acid in the whole atmosphere, although constituting but a twenty-five hundredth part, a sum eighty times as great as all the yearly consumption. It would therefore require eighty years to double the present amount, or to increase it to eight parts in ten thousand, which would not affect the health in breathing. But this increase, only one-eightieth part, is yearly withdrawn, and exact equilibrium kept up, by the growth of plants and trees, and by various other processes of nature.

A more accurate estimate of the products of fires and animals may vary this estimate, or increase or diminish it possibly to some extent.

How Ventilation is Effected.

Ventilation consists essentially in bringing in a constant current of fresh air, to mix with or replace the foul air which is drawn or driven out by the operation. Millions of human beings in the open air cannot vitiate it to the least appreciable extent, but as soon as a few are confined in an apartment, the air they breathe is quickly rendered unwholesome or poisonous. It has already been shown in this article that, although each individual breathes at most only about 400 cubic feet of air in twenty-four hours, yet, on account of the large quantity of carbonic acid expired, each adult person should have not less than 20,000 cubic feet of air to breathe in a day, in order that the amount of carbonic acid may not exceed eight parts in ten thousand. This would be equal to the contents of a room 25 feet wide, 40 feet long, and 20 feet high; or of four rooms each 20 by 25 feet, and 10 feet high. This supply can be obtained only by a constant current of fresh air from without; and to furnish this supply and to avoid the bad effects of chilling currents, is the object of ventilation.

It is commonly effected by producing currents through the agency of heat.

The principle on which this kind of ventilation depends may be understood by a simple experiment. Procure a glass jar open at bottom and top, and place it on a smooth table. Insert within it a small lighted candle or taper, fig. 190. The bottom fitting closely on the table, no air enters below, and in a short time the oxygen of the air within the jar is so far consumed, and so heavily replaced with carbonic acid produced by the combustion, that the candle in a short time goes out. Now raise one side of the jar below, by inserting a small stick or pebble, fig. 191, and re-light it. The candle now produces a current of fresh air from below, and continues to burn without any diminution. The air within the jar is expanded by heating, and being thus made lighter, rises through the opening at the top. Fresh air rushes in below to take its place, and a perpetual current is thus produced.

Fig. 190.—*Glass Jar tight below.*

Fig. 191.—*Ventilated Glass Jar.*

On this principle, all common contrivances for ventilating rooms are constructed.

If a large vertical tube has the air heated within it, that air becomes lighter, and rising produces an upward current, as shown by the arrows in fig. 192. If, on the contrary, it is surrounded with ice, the air within becomes heavier, and falls, producing a current downwards, fig. 193.

The longer the tube and the column of air within it, the stronger will be the current of air. If the contained air is warmed, it will rush upwards with more force in a long tube than in a short one, (fig. 194,) but if the contained air is made colder, a long tube will cause a stronger downward current than a short one—in the same

Fig. 192.—*Upward Current.*

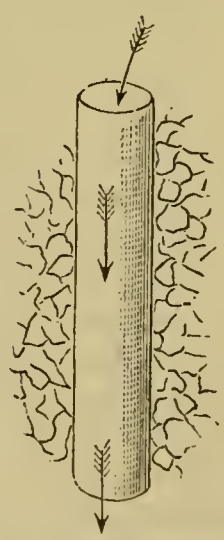


Fig. 193.—*Downward Current of Air in Ice.*

Fig. 194.—*Rapid Upward Current.*

way that a high head of water causes a stronger current than a moderate head, its increased weight rushing downward with more force.

The greater the difference in the temperature of the air within and without the tube, the more rapid will be the current.

Nearly the same rules that govern downward currents of water may be applied to upward currents of heated air, with this difference, that the air being about eight hundred times lighter, is more easily interrupted, checked or reversed by winds. For example—a horizontal stream of water may be made to run rapidly by a high head above, driving it, or a long column below drawing it. In the same way (but more feebly, and often irregularly,) the air may be driven through a horizontal tube connected with a heated vertical column below, or drawn or sucked through it if connected with a heated vertical pipe above. In fig. 195, *A* is a tube or stovepipe, which has been made hot, and the air within it, rushing upwards, draws the flame at *B* downwards and along the horizontal pipe.

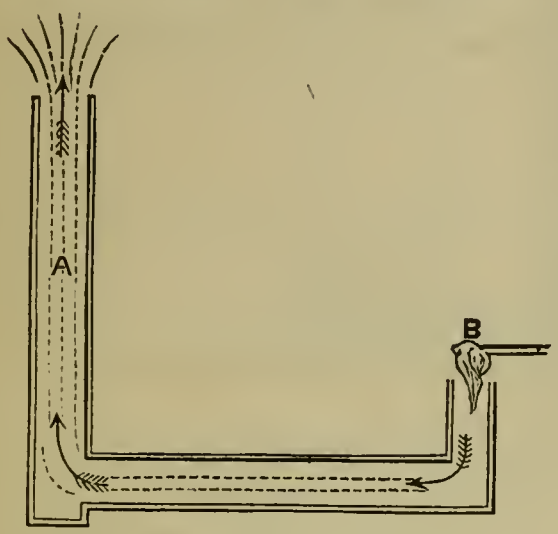


Fig. 195.

We have sometimes observed, on a sharp winter morning, that a certain room in the dwelling appeared to be so tight and free from crevices that it appeared impossible while there was no fire in the room that air could have entered it from without. But as soon as the fireboard was removed, and a wood fire started in the open chimney, it seemed as if a hundred voices broke forth at the windows and doors, in the whistling currents streaming into the room through minute crevices to supply the place of the air rapidly rushing up the chimney. Here was a striking proof of the importance of establishing an ascending current by means of heat, to effect the proper ventilation of the room. For, until the fire was built, there was no change of air. The church deacon was correct in his observation, but wrong in his theory, when he complained that the new stove in the previously unheated church, was so small that it only warmed the centre by driving the cold away into the remote parts, making these parts colder than before! When no fire existed, the remote occupants did not feel the cold streams which afterwards came in from all sides as soon as an upward current was established by the fire in the stove.

Modes of Ventilation.

In the early history of the country, or in the newly settled regions, the rude dwellings required little attention to ventilation, as wind currents poured in through the many crevices in the log dwellings, and the air of

the apartments was rapidly swept up at the open fire-place, through the large-throated chimney. Nearly all the heat received by the inmates was by means of radiation from the roaring wood fire—requiring frequent turning about to heat one side while the other was chilled. It was then, as some writer has remarked, "when men lived in houses of reeds, they had constitutions of oak; but when they live in houses of oak, they have constitutions of reed." They were however liable to the many diseases induced by the malaria of new countries, and they were more subject to maladies connected with colds when so continually exposed to sharp currents of air.

Whatever mode may be adopted for ventilation, special care should be taken to warm the fresh air before it is discharged directly on the occupants of the rooms, and to avoid the formidable diseases resulting from cold blasts blowing in from open windows on seated inmates with uncovered heads; for, as Dr. Angus Smith has remarked, "though foul air is a slow poison, we must not forget that a blast of cold air may slay like a sword."

The modes of heating now commonly employed, beginning with those which afford in themselves the least ventilation, are four in number:

1. As STEAM RADIATORS OR HOT WATER PIPES* merely heat the air of a room, without changing it at all, additional provision is absolutely necessary for supplying fresh air.

2. AIR-TIGHT AND OTHER STOVES change little more than the air required in the consumption of the fuel, and additional ventilation is necessary.

3. HOT-AIR FURNACES, if properly managed, with large air-pipes and with suitable ducts for the discharge of the air of the room, afford good ventilation, with no cold drafts; and if enough water is evaporated to prevent unpleasant dryness, they afford a good means of heating and ventilation. It is, of course, of the first importance that the tubes or trunks for supplying fresh air should receive it where it is pure and free from dust and bad odors.

4. OPEN-AIR FIREPLACES afford constant and rapid ventilation, with the loss of about seven-eighths of the heat of the fuel, discharged up the chimney.

Where stoves or radiators are employed, a small grate or open fireplace, consuming little fuel, and used in connection with them, will usually afford all the ventilation necessary, and give a pleasant apartment. The addition of a small open fire to a hot-air furnace will not only increase the agreeable character of the room, but assist in maintaining a pure air.

The accompanying representations of the sections of rooms thus heated,

*This mode of heating is adapted to large buildings only, and is too expensive for smaller establishments. The danger of leaks and explosions is a serious drawback, and its chief advantage is in carrying heat to a distance horizontally.

and of the air currents in ingress and egress, will serve to explain the course of these currents and the manner in which they maintain the purity of the air.

Fig. 196 represents the section of a room heated by means of a hot-air furnace; this furnace, being near the centre of the house, discharges hot air at one side of one of the rooms. The dotted lines and arrows show the course of the heated air in the room. For the purpose of giving the air a ready and uniform escape, a large air shaft or brick chimney is built, and within it is the large stovepipe from the kitchen or furnace below, or from some other regular fire, which heats the air about it in the air shaft, and causes a strong upward current. The air of the room, near the floor, is thus constantly carried off up the chimney at *B*, to be replaced by the fresh heated air from the register *A*.

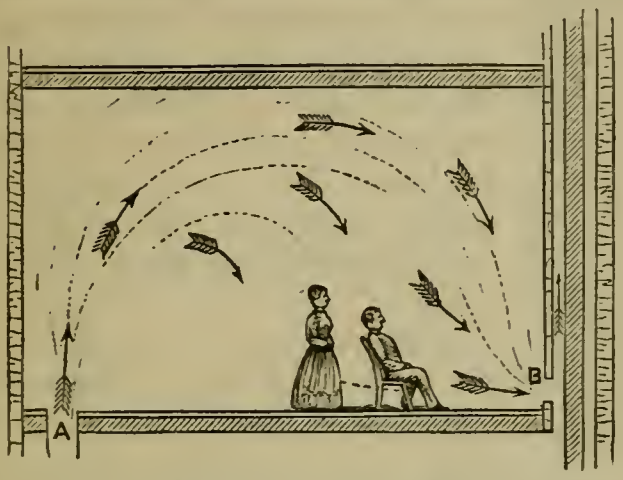


Fig. 196.—*Ventilation for Warm-Air Furnace.*

Two important objects are attained by placing the discharge pipe near the floor. The air being colder near the floor, and warmer toward the ceiling, we get rid of the coldest portion and retain the warmest, and thus economize heat. (It has been already shown that no material difference exists in the purity of the air, or in the proportion of nitrogen and carbonic acid near the floor or near the ceiling, as they soon become intimately intermixed.)

The other point gained is in promoting a thorough circulation of the air of the room, so that all parts become heated nearly alike. If the escape is made near the ceiling, as is sometimes done, the hot air rushes to the top and passes out without heating the rest of the air of the room, which remains cold, as well as impure, at the bottom, as shown by fig. 197—which, as Dr. Kedzie remarks, "is like the housewife throwing away the cream that rises to the top, while carefully preserving the skim-milk that remains at the bottom." The occupants of the room, therefore, while they may have the head warm, will inevitably suffer from cold feet; and small children placed on the floor may become chilled, and suffer, and be attacked with

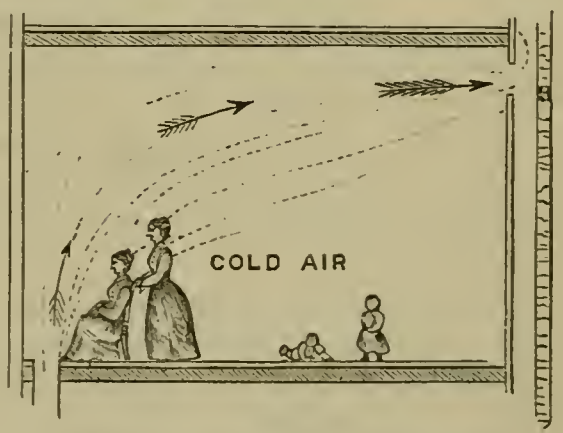


Fig. 197.—*Unequal Ventilation.*

colds and croup, and be charged with being "fretful," by their supposed care-takers, who enjoy the comfortable air above—fig. 197.*

Fig. 198 represents a room heated by a hot-air furnace, and ventilated and partly warmed by means of a small grate or open fireplace opposite. In this case a simple chimney will answer to draw off the bad air, and need not contain an air-pipe within it, (as in fig. 196,) for the heat of the open fire will produce a sufficient draught to draw off continually the air from the room.

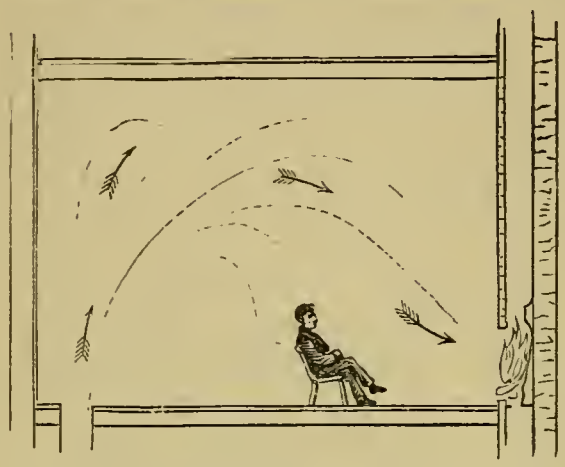


Fig. 198.—*Furnace and Open Fireplace Combined.*

It must be borne in mind that the chimney which is thus employed for removing the foul air, should possess sufficient height to cause a constant current. If quite short, it will be likely to possess a feeble draft.

The proper size of all air-shafts, and ducts for the withdrawal of impure air from occupied rooms, will be explained in another part of this article.

Ventilating Stove-Heated Rooms.

The cast-iron stove, the most common heater in the dwellings of the American people, and which Leeds justly asserts is worth more than all the gold mines of California, is attended with less expense than any other heater in purchase and in the supply of fuel, and has been needlessly denounced. The want of ventilation with which its use has been generally attended, is charged as a fault of the stove itself. Charles Dickens went so far as to stigmatize it as "that eternal, accursed, suffocating, red-hot demon of a stove, so commonly found in America," and other writers have followed nearly in the same strain. If the stove is large enough to warm the room without being heated to redness, there will be nothing of the "burnt-air" odor which results from burning the minute particles of organic matter always floating in the air,† which is so ununpleasant to all.

The main defect in the use of stoves comes from the fact that the air currents up the pipe, produced by the very moderate amount of fuel used, are quite insufficient to change the air of the room enough for the health of the occupants. Hence the headache and lassitude so common

* In rooms as commonly warmed by stoves and furnaces, without any provision for equalizing the temperature at the ceiling and floor, there is usually not less than 20° difference, as any thermometer will readily show.

† An electric beam through the air has shown the presence of impalpable dust, and that inhabited apartments are charged with this organic matter.

in closely heated rooms. All we have to do is to add some adequate means for effecting good ventilation.

Dr. Kedzie proposes two modes, one cheap, simple and imperfect; the other attended with a moderate expense, and much more effective. The first is simply to admit cold, fresh air at the top of the window, by inserting two panes in the upper part of the sash—a space *below* the outer pane and a space *above* the inner pane, as shown in fig. 199, so that when the current enters, it is deflected upwards into the room, and tends to become mixed with the warmer air in its descent. The draft of the stove not being sufficient to change the air of the room, we would place a register near the floor, to allow the foul air to escape by being drawn upward in the chimney with the warm air from the stove-pipe, which produces an upward current. An easier and more efficient arrangement to throw the entering air upward into the room, would be to screw a sheet of zinc or sheet-iron on the upper edge of the window sash, as shown in section by fig. 200, and then drop, more or less as required, the upper sash, so as to leave a proper opening. The breadth of the sheet of metal, and its upward inclination, would direct the current farther into the room. For this contrivance, the upper casing should be so made that it will allow closing the window when desired. It has the additional advantage of increasing or lessening the amount of admitted air, according to requirement, by raising or lowering the sash to any degree.

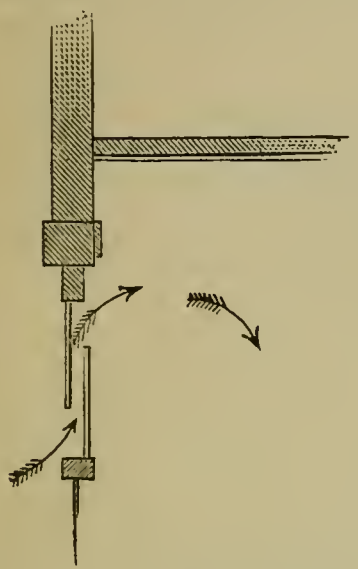


Fig. 199.—*Ventilating through a Window.*

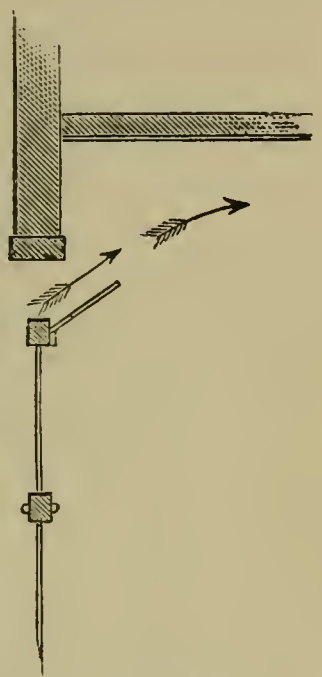


Fig. 200.—*Window Ventilation—another mode.*

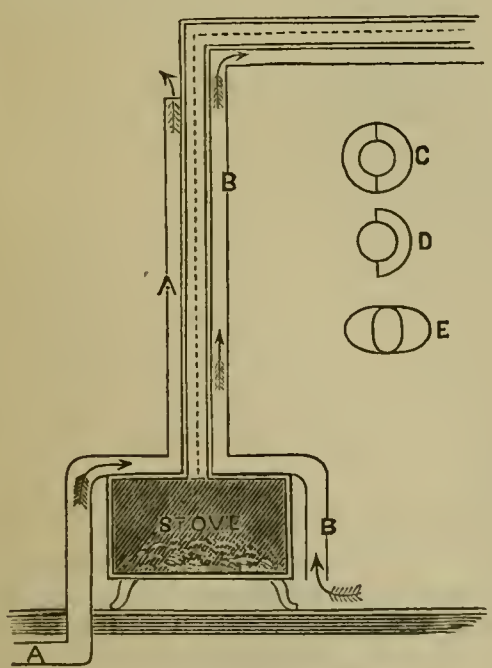


Fig. 201.—*Ventilating a Stove Room.*

The other mode proposed by Dr. Kedzie, is effected by the following contrivance, fig. 201, which depends on the same principle as that adopted in

the use of hot-air furnaces, and described under fig. 196, the heat of the stove being employed both for removing the foul air and for warming the fresh air: A stovepipe, say six inches in diameter, is placed within another pipe a foot in diameter, which may be called *the shaft*—shown in cross section at *C*, fig. 201. The stovepipe is thus enclosed within the shaft, and a space of three inches surrounds it. This space is divided into two parts by a partition of sheet-iron on each side, extending all the way up, and thus making two shafts, one of which is the fresh-air shaft, for admitting and warming the air from without; and the other is the foul-air shaft, for carrying it off. These shafts are closed below by resting on the top plate of the stove, only the stovepipe for the smoke entering the stove at the top plate. The fresh-air shaft, *A*, is fed by a six-inch pipe coming in from without, under the floor, as shown on the left. It extends nearly to the elbow above, after which the cross-section is as in *D*. Another six-inch pipe, *B*, opening near the floor, enters the foul-air shaft just above the stove, and this air is conducted to the chimney.

Now this contrivance will work as follows: The vertical stovepipe will heat the air in both shafts, and make upward currents. The fresh air, made warm, will pour out into the room at the top, and the foul air, near the floor, will be sucked up by the foul-air shaft, and will pass into the chimney. These two currents operating together, will cause a downward flow of air from the top of the fresh-air shaft to the bottom of the foul-air shaft, and tend to equalize the temperature of the upper and lower parts of the room, at the same time that pure air will be constantly supplied.

The construction and the erection of the stovepipe as here designed, will be somewhat difficult and rather complex. We would propose a simpler form, and one which will be more easily set up, by placing one oval pipe within another and a larger one, as shown by the section *E*, fig. 201; or more distinctly, and on a larger scale, by fig. 202. They are to be merely riveted together at the place where they touch, and will thus form three divisions—the central or smoke-pipe, and the two shafts on either side, which will be warmed by the central one containing the ascending smoke. This double-oval pipe is first to be set in its place on the stove, and then the two short pipes for supplying fresh air and carrying off the foul air inserted into it in any convenient position.

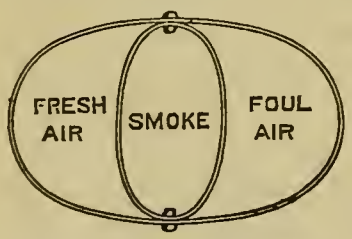


Fig. 202.—*Cross-Section of Compound Stovepipe.*

Prof. Leeds proposes to avoid the cold currents which stream in at the bottoms of doors and from other crevices, by bringing in the fresh air through a pipe which shall discharge it directly over the stove, on which it will fall and become warmed as it descends down its sides. This would answer well when the wind comes from the same side as the fresh air pipe; but when it shifts to the other direction it would blow the air of the room out through this fresh-air pipe, and the warm air over the stove would be

wasted, while cold currents would enter by crevices on the windward side. The same difficulty, but in a much less degree, exists in Dr. Kedzie's contrivance. It would be obviated in both cases by a pipe on each side, closing the one on the lee side and opening the other.

An efficient contrivance for ventilating stove rooms is described in the COUNTRY GENTLEMAN by its correspondent "W." of Tyrone, Pa. An air-pipe, fig. 203, brings in a supply of fresh air from beneath the floor, and being heated by near proximity to the stove, causes an upward cur-

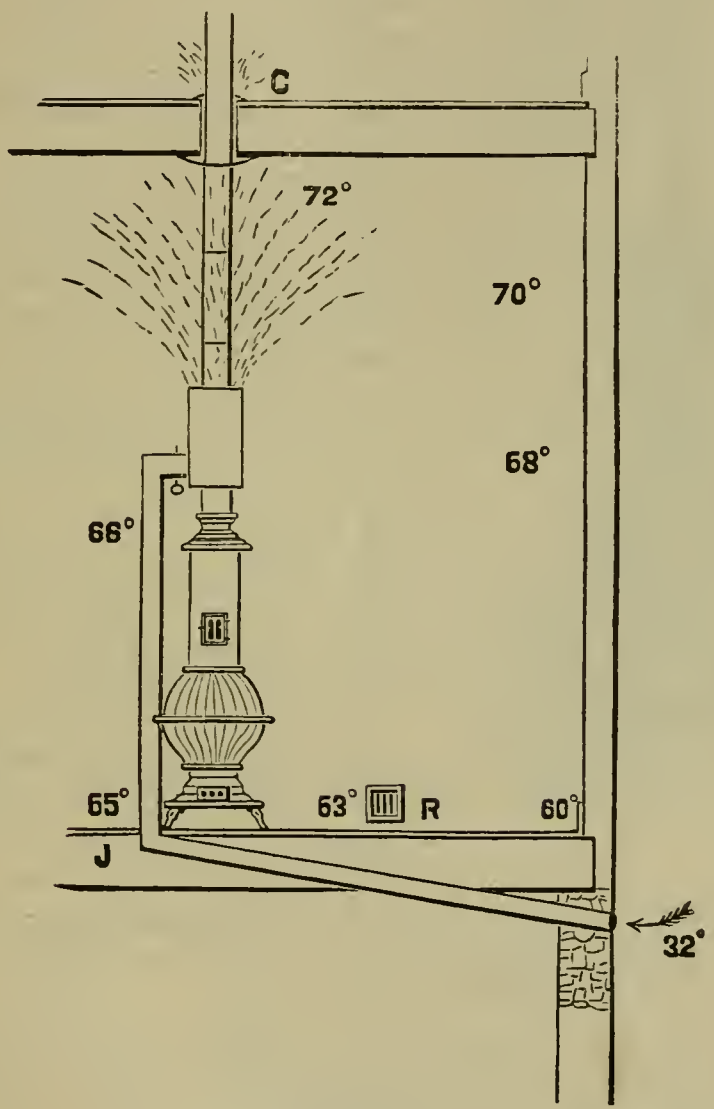


Fig. 203.

rent, drawing in the air from without. It is delivered in the direction of the ascending current of heated air above the stove, and then tossed along the ceiling in all directions. The register *R*, inserted in the lower part of the chimney which receives the stovepipe above, conveys off the air from the lower part of the room, causing downward currents, and nearly equalizing the temperature above and below. Another portion of the air near the floor is carried up in the air current which feeds the fire in the stove, which is not enough in itself for perfect ventilation. As a proof of the

efficiency of this contrivance, it is stated that before its adoption the temperature of the air near the floor was about 50 deg., and at the ceiling it was 80 deg., while now the greatest difference is not more than 8 deg.

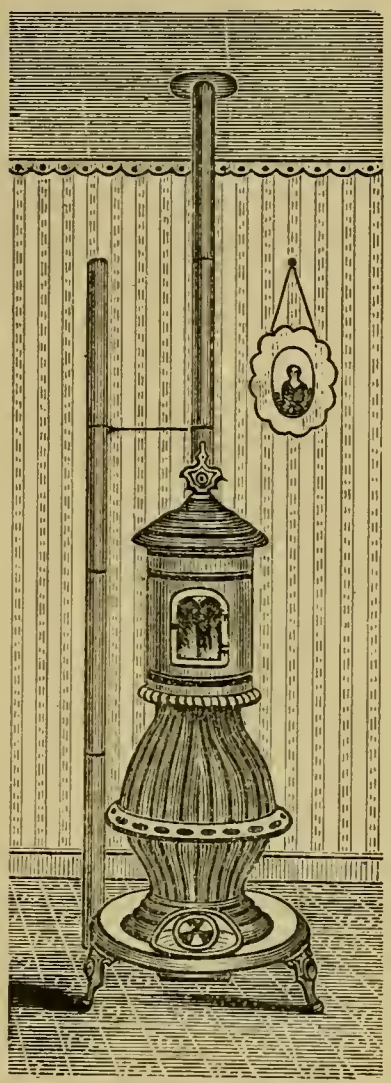


Fig. 204.

Fig. 204 is a modification of this contrivance, the air in the warmed pipe which brings the fresh supply from without, being discharged near the ceiling, and operating not unlike the air currents admitted at the top of the window already described, but unattended with any cold current.

Ventilation of School-Rooms.

School rooms and public halls, occupied by large numbers of people, need a better ventilation than private dwellings. Such rooms should have several registers for the escape of foul air, distributed in various parts. The flues from these registers may pass to the large vertical air shaft, by being placed under the floor, between the joists, and between the ceiling of the room below and the floor above. If the room is not large, a few registers around it near the floor will be sufficient.

Fig. 205 is a plan of such a room, where *A* is the chimney, built large enough to serve as an air shaft, and containing within it the round pipe from the furnace in the basement, or from the stove in the room, as the case may be. *B* is the place for the hot-air register from the furnace or for the stove, and *C C C C* are registers at the floor for the escape of foul air. The double dotted lines show where the tubes are which carry the foul air to the shaft *A*. These tubes are immediately beneath the floor, and between the joists, which run parallel with the tubes until they reach the turn which carries them to the shaft. For this purpose the joists are not let into the timber which supports their ends at the dotted line *D D*, but simply rest upon it, allowing the tubes to pass over it and between the joists.

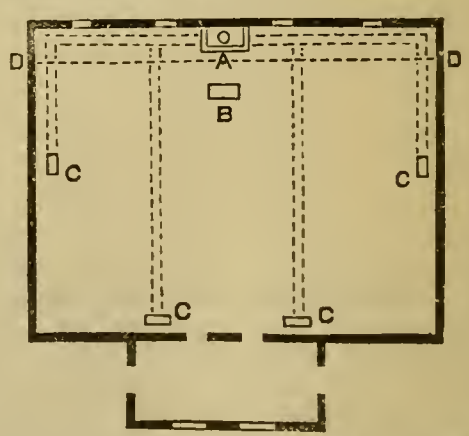


Fig. 205.—*Plan of Small School Room, showing Ventilator Ducts.*

By this arrangement the heated air from the furnace or stove at *B* rises and is carried down again in the currents which set towards the four air registers, as shown in fig. 206, representing a vertical section of the room, *A* being the shaft, with smoke-pipe within it, *B* the hot-air pipe, and *C C* the registers for foul-air pipes, which pass under the floor to the shaft *A*.

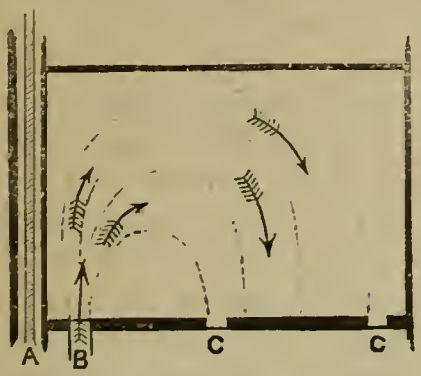


Fig. 206.—*Vertical Section of School Room.*

In the plan, fig. 205, it would be more convenient in some respects to place the hot-air register or stove near the entrance doors on the opposite side, but a serious disadvantage would be that at every opening of the doors the warm air would be swept out-doors and wasted, while in the arrangement as represented, the warm air must cross the half or whole breadth of the room before it can escape, and will thus impart its warmth to the occupants—shown in vertical section, fig. 206.

Where the stove only is used and the room is of moderate size, there is less objection to a door entering on the same side as the stove, and in this case the series of foul air pipes may be simpler, as shown in the plan, fig. 207, the three at *C C C* being sufficient to equalize the air of the room.

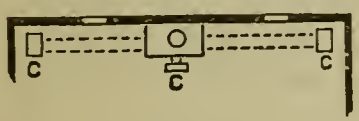


Fig. 207.

It is hardly necessary here to remark, what is familiar to furnace builders, that fresh-air tubes which lead to the furnace should be placed on opposite sides of the hot-air chamber, so that a constant supply may be had when the wind changes to opposite sides of the house. Otherwise a strong wind in a contrary direction will blow the warm air from the chamber through the tube out-doors. A valve or slide in each tube, readily accessible and easily closed will thus entirely control the current in whatever direction the wind blows.

In larger schools and more ample assembly halls, a larger number of foul-air pipes will be necessary, and they may be placed beneath desks or permanent tables.

An objection to placing registers for the ducts in the floor is the danger of their becoming filled by careless attendants, who may discharge the sweepings down them. Where this difficulty is feared, they may be placed in the side walls near the floor, the ducts being made to meet this arrangement.

When carpets are laid on the floors, it will be most convenient to place the ducts in the side walls.

Large School-Rooms.

Dr. Kedzie gives the following description in the First Report of the Michigan Board of Health, of a country school-house capable of seating one hundred and twenty-six scholars, and warmed by a stove. We have

diminished his plan with little alteration in fig. 208. It possesses all the essentials for good ventilation.

"The air to supply the lower room enters by the air-pipes marked *A A*, passing beneath the floor and opening under the stove, *B*, around which is a galvanized iron jacket entirely surrounding the stove (recessed for the stove door) and rising up as high as the top of the stove, [according to Ruttan's method.] The space between this jacket and stove is one foot on all sides. The cold air as it enters is thus warmed by the stove before reaching the inhabited part of the room. The scholars sitting near the stove are screened from the excessive heat of the stove, by this jacket.

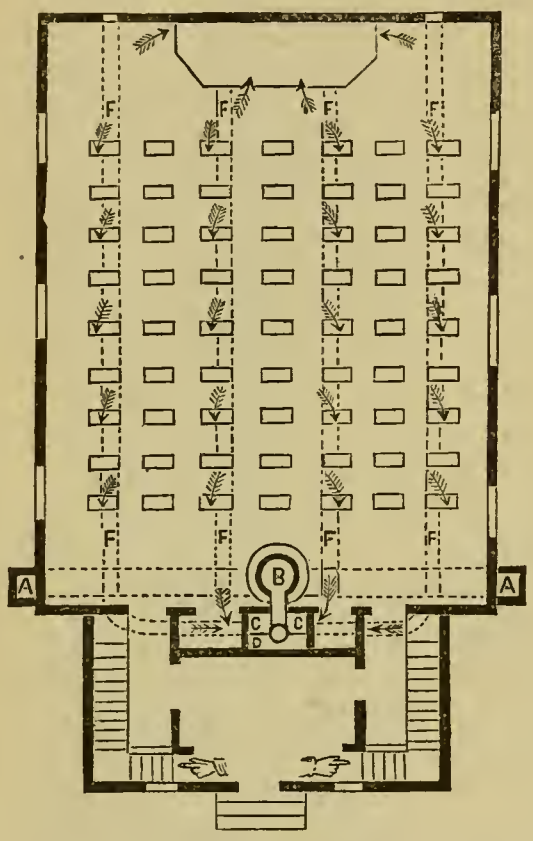


Fig. 208.—*Plan of School-house, with Ducts Under the Floor.*

"The foul air is drawn off by the foul-air ducts, *F F F F*, these ducts being formed by the spaces between the joists which run lengthwise with the body of the house, while the joists in the vestibule run at right angles to these.* The direction of the foul air is indicated by the arrows at the floor level. The foul-air flues all terminate in the front half of the ventilating shaft, *D*.

"The pointers in the vestibule show the direction of ascent up the stairs.

"It is essential that the ventilating shaft should be carried up some distance above the ridge of the roof, with a cowl on the top.

"The position of the stove in the upper room is the same, and is supplied with air in the same manner as the stove in the lower room.

"The foul air of the upper room is drawn off by foul-air ducts exactly corresponding with those in the lower room, except that they all enter the compartment *C* in the ventilating shaft. For successful ventilation I consider it essential that the foul air of each room shall enter a separate compartment in the ventilating shaft, and not one common shaft. These separate compartments are secured by having vertical iron plates passing from the smoke-pipe to the interior surface of the shaft where they are

*As we have already stated, the joists should rest on the cross timber, and not be let into it, so as to allow these ducts to pass. The arrows under the alternate desks show where registers are placed for the escape of foul air into the ducts—thus giving equal ventilation to all parts of the room.

imbedded in the brick work. In this way two or more ventilating shafts may be made, with the smoke-pipe as their centre, and all warmed by the waste heat of the smoke-pipe, these ventilating shafts having no communication with each other throughout their entire length.

"By placing a small stove in the bottom of the ventilating shaft (in the basement), the smoke-pipe in the centre of the ventilating shaft can be heated, and the ventilating system kept in active operation without warming the school-rooms even in the hottest weather. [Or, if the wind is strong, Espy's caps at the top will produce sufficient current without fire.]

"The fresh-air flue, *A A*, is represented double, so that fresh air can be secured, whatever is the direction of the wind. Each extremity of the fresh-air flue should be provided with a valve to open or close the flue, and thus regulate the influx of cold air, even when very high winds prevail. The handles of these valves will be in the school-room, so that the teacher can open or close the valves, and thus control the flow of air without leaving the room. The teacher alone should have control of these valves. The air to feed the fire in the stove should be drawn from the school-room, and thus assist in ventilating the room."

It will be observed in this plan that the stove is so placed that currents from the entrance doors will not be likely to carry much of the heat from it out through these doors.

Dr. Kedzie further observes, in urging the importance of creating a circulation in the upper and lower strata of air: "Infants creeping on the floor often suffer from the cold, while the mother is living in a warmer climate of the upper air. She wonders 'what makes baby so fretful,' and on lifting the little sufferer, she is astonished to find how purple and chilled his limbs are. Children at school often suffer in the same way. The thermometer hung up six feet from the floor, marks 65°, and the teacher pronounces the room warm enough, and attributes the complaints of the little ones to that manifestation of total depravity, 'children are always complaining.' With the head hot and the feet aching with cold, how can they be sweet and placid? In examining the school-rooms in this State I made frequent observations on the temperature at the floor-level and at the desk-level, and often found the difference from 8° to 15°—in one instance 19°, and in another 21°."

In all contrivances of the kind there is no fear that a draft will not be produced at each duct register; for if the air is heated in the shaft, so as to rise with considerable force, it will not fail to draw the air down from the room at every opening connected with it.

Warm-Air Furnaces.

Leeds, in his Lectures on Ventilation, speaks of the use of "the miserable hot-air furnace," as a "refined system of murdering human beings," which has "spread like a devouring pestilence over the whole land," and he says that "all warmed air is unwholesome and debilitating," and in proof

cites "the fearful mortality whenever the air in summer reaches nearly the temperature of the body," although warmed by the sun itself.

Now the observation and experience of forty years satisfies us that warming by furnaces has special advantages, and it need have no drawbacks. 1. Instead of warming a room, as above stated, to "nearly the temperature of the body," we would never come within twenty-five degrees of this temperature. 2. The heat of summer becomes unhealthy because it rapidly promotes putrefaction. 3. A temperature of 68° or 70° in summer air is neither debilitating nor unhealthy in itself, but pleasant and refreshing.

The furnace, properly managed, has important advantages over other modes of heating: 1. It furnishes a constant supply of fresh air from the atmosphere without, and a room thus treated may have the air changed without trouble several times in an hour. 2. The dryness, so often objected to, may be prevented by a large evaporating basin in the air chamber, which should be kept perfectly clean, and there should be at least eight or or ten gallons evaporated every twenty-four hours in winter, for every room containing 2,000 cubic feet of air occupied during the day. 3. The odor of "burnt air" may be entirely prevented by using a furnace large enough to obviate heating to a temperature approaching redness, and by providing air-flues so large that the heat of the warm air entering the room may never be above blood heat. This would silence the objection so often repeated, that red-hot iron permits the passage of carbonic oxide through thick plates, by which this deadly poison enters the room.*

The evils of hot-air furnaces come from insufficient fresh-air tubes; from too small capacity, requiring high heating; from small warm-air pipes, and from the absence of evaporating dishes.

The amount of dryness in the air of furnaces in winter, when not provided with evaporators, is scarcely appreciated. Air at 30° will hold only one-eighth as much moisture as at 100°; and it may therefore be easily understood why the fresh, cold air from without when warmed to the natural temperature of the human body, and holding only one-eighth of the moisture it is capable of retaining, must produce a sensation of painful dryness. The trouble is enormously increased when air at zero without is heated to the temperature of red-hot iron without any provision for supplying moisture.

VENTILATION IN SUMMER.—When the temperature is nearly the same both in and out of doors, a window thrown open affords very small change in the air of the room, as little or no current is produced through the

*The French experiments of Deville, Frost and Morin, to show that carbonic oxide permeates red-hot cast iron, and the proof that has been furnished that wrought iron is not proof against its passage, indicate at most that the quantity of gas which can go through a heavy, compact, metallic plate, must be exceedingly small, and the results are still doubted by some scientific men. But even if thoroughly established, they need form no objection to stoves or furnaces, which should never be red-hot. The tendency of the draft is to draw all currents from crevices or openings, inward and up the chimney, and it is only a reversed draft that would throw them into the room.

window, except in strong wind. School-rooms and public halls are for this reason insufficiently ventilated in summer, unless additional provision is made for this purpose. The foul-air shafts will not accomplish the object unless a current can be produced within them. There are two ways of creating this current. One is to place a very small stove at the bottom, which will heat the air above, and soon cause an ascending column, and the other is to place an Espy, a Mott, or other ventilating cap, at the top, above the roof, when the wind will nearly always afford some current, and whenever there is wind, whether fire or not, motion will be imparted to the air in the shaft. The chimney-caps are the simplest, require no attendance or fuel, and should always be kept on the summit of all chimneys used as air-shafts.

Dimensions for Foul-Air Flues and Ducts.

It was shown in the early part of this article that every person should have at least 20,000 cubic feet of good air to breathe in 24 hours. The flues for carrying off foul air should be equal to the conveyance of this amount, to be replaced by the fresh air which would at once take its place if proper access were provided for it to the rooms.

The currents produced in shafts will vary with their height, and with the heat imparted to the air within them, which should not be less than 10° above the unheated air without. The velocity will vary from 4 to 7 feet per second if heated artificially; and it will vary indefinitely with the force of the wind when moved by a ventilating cap at the top. Under ordinary circumstances, and in cold weather, when artificial heat is used, we may put the average velocity of the air in the shafts at 5 feet per second—more in large ones, and less in small ones. A shaft equal to a foot square would therefore discharge 5 cubic feet per second, 300 per minute, 18,000 in an hour, and 432,000 in 24 hours. Allowing 20,000 cubic feet for each person, a shaft a foot square would be sufficient for 21 persons, and one 2 feet square would answer for 84 persons. These figures will readily enable any one to determine the size for any building or number of persons, always allowing more as the shafts are smaller, with more friction of the air against their contracted sides. It would be better, however, to provide against contingencies, and give a higher allowance than 20,000 cubic feet in 24 hours for each person, (which is the lowest possible limit with health and safety,) and to double the area of the foul-air shaft, and allow a square foot for each 10 or 12 persons, especially if the shafts are small. The registers and ducts must have corresponding apertures.

Smoke from Lamps.

A separate provision must be made for the escape of the carbonic acid and smoke from gas-burners, lamps and candles. These noxious gases rise to the ceiling, and should not come down again, care being especially needed in mild weather when there is no fire, and when the air of the room

is more nearly stagnant. For this purpose an opening should convey these gases directly into the chimney or air-shaft at or near the top of the room. This is especially necessary where large lights are burning. A candle (six to the pound) consumes only about one-half or two-thirds the oxygen of one person, and manufactures a corresponding proportion of carbonic acid; but a medium gas-burner, or a large oil lamp, consumes as much air as five persons.

Ventilation in Workshops.

The following mode of withdrawing disagreeable or unhealthful odors from manufacturing rooms, to prevent the workmen from inhaling them, is

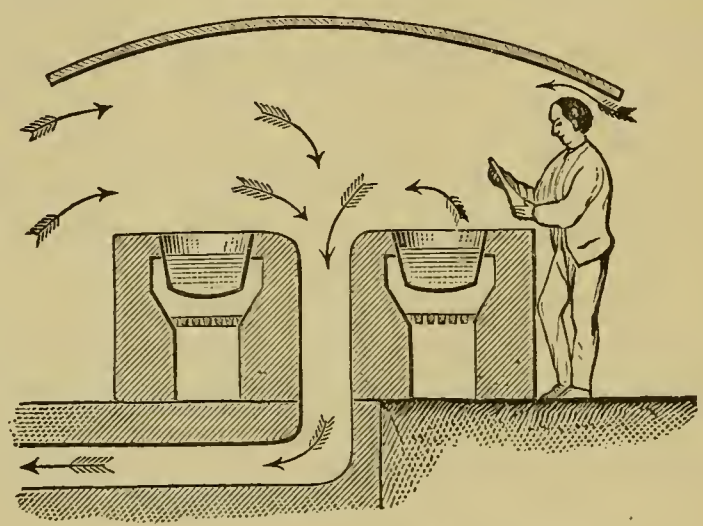


Fig. 209.—*Ventilated Workshop.*

given by Arthur Morin, and it serves to show how currents may be controlled by the use of air-shafts. In the cut (fig. 209) two vats are represented, between which a strong air current is created by connection with a heated shaft, and none of the fumes reach the workmen, being carried down as fast as produced.

Simple Test for Air.

As already stated, the air of rooms should never contain more than eight parts of carbonic acid in ten thousand. The following simple test for such air is given by Dr. Angus Smith: Fill a half-pint vial with pure water (rain water) and empty it in the room where the air is to be tested, by which the vial will be filled with the air of the room. Then pour into the vial half an ounce of lime-water, and shake it thoroughly. If it remains perfectly transparent, with no trace of milkiness, the air does not contain more than eight parts of carbonic acid in ten thousand. In well ventilated rooms with few inmates, the lime-water will commonly remain perfectly clear; in crowded and badly ventilated apartments it will at once become turbid. Breathe through a tube into the lime-water, and it will become still more milky, showing the large amount of carbonic acid always

thrown out from the lungs. The milky appearance is caused by the carbonic acid combining with the lime of the water, and forming the white precipitate of carbonate of lime.

Amount of Air Breathed.

It has been already stated in this article that an average of about 24 cubic inches are inhaled at each breath, although this quantity varies much with the effort made in filling the lungs. The experiment is easily tried by the following simple apparatus: Fill a fruit jar with water, and place it mouth down in a pail half filled with water. It may be supported on three small tumblers, as represented in the cut, fig. 210. Procure a tube about a foot long, bent as shown in the figure, and a quarter or third of an inch calibre. It may be of glass, lead or tin. Then, closing the nostrils, breathe a medium breath through the tube into the inverted fruit jar. It will rise in the form of air at the top, and show the amount of air thrown out of the lungs.

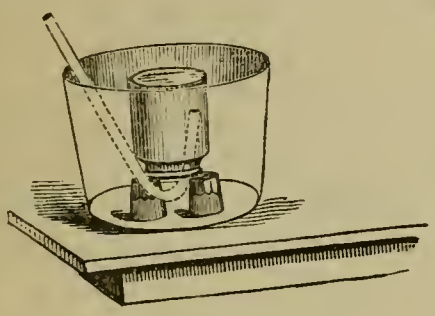


Fig. 210.

General Conclusions.

1. For common living rooms, occupied by a few persons only, and heated by a stove or warm-air furnace, a small, open fireplace or grate will give sufficient ventilation to the room; it will add to the cheerful character of the apartment, afford additional warmth in cases requiring it, and obviate the necessity of heating the rest of the room to so high a temperature as without it.

2. In other cases, where rooms are heated by a furnace, a large register set at the floor in the chimney which carries up the smoke from the furnace or kitchen, will afford good ventilation for rooms occupied by few persons.

3. In school-rooms or halls densely filled with people, a large air-shaft heated inside as already described, will be essential; and an area of the cross section of the shaft large enough for ten square inches for each person will be none too much.

Things to Avoid.

1. Stoves and furnaces so small that they must be heated red-hot in order to get warmth enough for the rooms.

2. Dry air from furnaces; to be prevented by a free evaporation of water in the air chamber, which should be about 8 or 10 gallons in cold weather for a room or rooms containing 3,000 cubic feet; less when the weather becomes milder.

3. Placing warm-air registers near doors, where the warm currents may be swept out of the room without warming it at all.

4. Too small shafts and air ducts. In a school-room containing fifty

students, which had a fresh-air pipe only two inches in diameter, nearly every one suffered from headache. The fresh-air pipe should not have been less than twenty inches or two feet square, and the ventiducts correspondingly large.

5. Receiving "fresh air" for furnaces from cellars and basements, instead of from out-doors in suitable trunks high enough above ground to prevent dust from entering.

6. Allowing the fresh air trunks of furnaces to become receptacles for rubbish.

7. Placing foul-air ducts at ceilings instead of near floors.

8. Never warm a foul-air shaft by heating it at top, but always at the bottom, to give force to the whole column of warm air.

9. Air ducts should never terminate in a close garret, where the air cannot escape.

OSAGE HEDGES AT THE WEST.

By C. G. Taylor, Galesburgh, Illinois.

HAVING HAD MUCH EXPERIENCE in hedge culture for the last twenty-five years, I will try to reply to your inquiry. Though in soil and climate the East differs from Northern Illinois, the main essentials of treatment there need vary but little from ours here.

In 1849, I helped set a hedge row of 120 rods, then supposed to be the first, north of the centre of Illinois. The plants cost $20 per 1,000, besides the freight of some 200 miles, using 2,000 plants for the 120 rods. That hedge is yet in good condition, though it has gone through many manipulations. Prof. J. B. Turner of Jacksonville, Ill., claims to be the originator of the use of the Osage orange tree as a fence hedge. We are at least taught to yield to him the honors. What would be the condition of our Western farmers to-day had we been deprived of this tree (as it truly is a tree of large growth when left to its natural habits) in fencing our prairie farms? The many thousands of miles now in practical use show the benefits it has conferred when properly controlled by the experienced hand. At first our prairies were settled near the groves or belts of timber skirting the rivers and small streams, where timber could only be found for the log cabins and a few rails for fencing. The limited amount was soon exhausted, or held at so high a figure that the new comer with his small capital must resort to a substitute of some kind. Prairie grass sods were cut and laid in tiers some three feet high, with the soil from under where the sod had been taken thrown on the back side, thus forming a ditch of some two feet deep, as shown in fig. 211. Many fields were fenced in this way. Some who could buy a few oak or black walnut trees, would

saw them five feet long and split them into stakes, as small as they could, and drive them into the tough sod, in straight rows, leaving them level on top. They then used a narrow strip of pine board on top by driving a ten-penny nail through into the top of each stake—fig. 212. The sod fence furnished a nice place for the sportive horned animals, in amusing themselves in making the *dirt fly*, making gaps difficult to mend. The stake fences would soon rot at the ground, and blow over with the wind, and being made of small material, lasted only for a few years.

Fig. 211.—*Sod Fence—Section.*

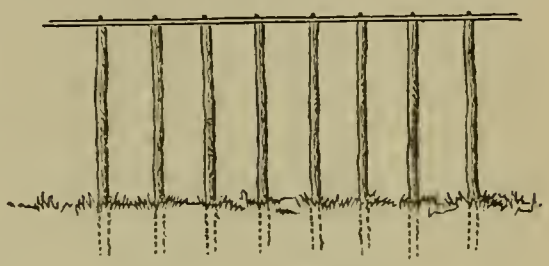


Fig. 212.—*Stake Fence.*

As the country was approached by railroads, a rush of new settlers poured in to buy our cheap lands. Boards from the lake regions via Chicago were furnished. Native oak and black walnut posts were at hand. In this way our farms miles away from growing timber were fenced. Pine lumber was also furnished in rafts from the Wisconsin pineries. Soon our sod and stake fences were gone and among the past. The question was often asked, where will the supply come from twenty-five years hence? What for the future? Wire fences were introduced. Many were the advocates for this new kind of fence. Little lumber was needed, and that only for posts twenty feet apart.

Among the strong friends of this fence was Horace Capron, formerly Commissioner of Agriculture, who worked and wrote much in its favor. Many believed that a new era had dawned upon the prairie farmers. Thousands of miles were put up. Where all the wires were kept in place, which required much watching, crops were protected from cattle and horses, but no real defence was furnished from hogs and sheep. At this time there are only fragments of wire fence left—fig. 213.

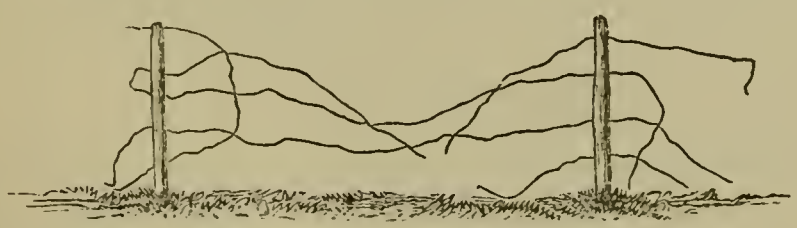


Fig. 213.—*Remains of Wire Fence.*

As the northern pineries could not always last, something more was needed. The vast prairies of the Western States containing several millions of acres of the richest land in the world, must be fenced with some cheap material, within the means of small farmers, or their lands were destined to fall into the hands of heavy capitalists, to be laid out into large

tracts similar to those in England. But our small Yankee homes must not be broken up in this way. Each must be the lord of his own home. Now when the new settler comes he finds the section corners established by the government surveyor, sometimes miles away from a single growing tree, or from the sight of one. He finds the corners of his half or quarter section, and puts up his buildings according to his means. He buys his posts and boards, or gets his small stakes to drive in the ground, putting his fence six feet within the road limits, as by "law provided," or on lines joining his neighbor's six feet on either side of the true line, as by agreement between the parties, and prepares the ground and sets the hedge. In the newer States the practice now is the following:

As soon as possible break the prairie sod some twenty feet wide all around the quarter section (160 acres, and there are many farms no larger), so as to fit the ground for the hedge row. The hedge for inside fencing is often grown by having no fence by the side of it to guard it from being disturbed by domestic animals, except in fields used for pasture. Then the hedge is set on the opposite side of the wood fence. When grown to afford sufficient protection of itself, the wood fence is removed to do like duty on some other part of the farm.

On my farm in Rock Island county (now sold) I set with my own hands 840 rods of Osage hedge plants. About one-fourth of them I raised from seeds which grew from a few trees I allowed to grow without trimming, around my milking yard. I commenced to upturn the prairie sod in 1853. In 1866 I had it divided into seven fields. During this time I had used small split stakes, as described above, and common post and board fence to guard and protect the hedges up to an age and fitness to "turn out," as we express it, when the hedge is a hedge, or full protection. I had put up good, plain farm buildings; the old wooden fences were all gone, using no wood except for barnyard and dooryard purposes, gates and gate-posts. I had of living fences over two and a half miles, including the hedge around a ten-acre orchard, so perfect that if anybody wanted fruit, there was no other way to enter the orchard than by the front gate. In the year 1866 after a residence of thirteen years, I received the first premium on my farm from the State Agricultural Society.

It is not uncommon in Illinois and Iowa to find farms of 160 to 320 acres perfectly fenced with nothing else than the Osage orange. Boards and pickets are only used about farm buildings. Thus from my long experience and present observations I will try to present, in as brief a way as possible, the way now practiced to produce the best hedge.

As I have had no other soil to use than that of the prairie, which is free from sand and stone, I cannot speak of other soils, but conclude that the Osage orange will grow well where the apple tree will. The ground for the hedge row must be in perfect order. A good way to do is to plow a strip in the fall about twelve feet wide, and leave the last or centre furrow a foot or more deep. In the spring, just before setting out time, about

the middle of May, when the ground is warm, commence with the plow in the centre, and turn back the ground, forming a single ridge. Harrow well. With a shovel plow make a deep furrow exactly on the line, and with a hoe take out all lumps or anything else. Draw a line over the centre. Select plants of an even size and vitality, and stand them in the furrow, the tops leaning slightly on the line where red threads are tied, one foot apart. With the hoe the roots are rapidly covered, and the earth well pressed down with the foot, care being taken to have each plant stand erect and about four inches above ground, as represented in the cut, fig. 214. Cultivate as carefully as a row of corn should be. As I have known young hedges to be injured in spots by the frost going below the roots in winter, (there is danger if a fence is not near by to gather the snow,) cover the young hedge with straw, coarse manure, or by throwing up on each side several furrows of earth. In the spring clear all away.

Fig. 214.—*Newly Set Hedge.*

The treatment for the second year is simply to cut off in the spring all above one or two buds on each branch, and to leave all level on top to the height of some two or three feet. This trimming is done by using hedge shears. We now have it as represented in fig. 215. The treatment for the second year is the same in cultivation. No weeds or grass sods are allowed to interfere, in order to have the growth of all the trees alike. The reason that it is necessary to leave a bud at starting of the growth for the second year, is that the small tree wants leaves wherewith to draw support from the atmosphere. Each of these buds will throw out a lateral or limb.

Fig. 215.—*Second Year, before Trimming.*

Fig. 216.—*Second Year, after Trimming.*

In the spring of the third year we start as shown in fig. 216. Clean culture is strictly observed. No trimming is needed this year.

Fig. 217.—*Spring of Fourth Year.*

Fig. 218.—*The Same after Trimming.*

In the spring of the fourth year we have it as represented in fig. 217, as grown the year before. Some of the limbs are six to eight feet high. With the use of the hedge shears we cut back as represented in fig. 218. For the fourth year's growth we start as in fig. 218. In August, as soon as some of the limbs are eight to ten feet high, too high to reach with the shears, we use a hedge knife. The handle is some three feet long, the blade a foot or more long and two to two and a half inches wide, tapering to a point at the end. The edge is curved a little to prevent the limbs from moving away from the operator on being struck—fig. 219. At this trimming we only cut away limbs of the most rampant growth, and crooked snarls.

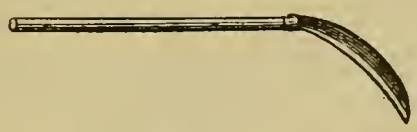
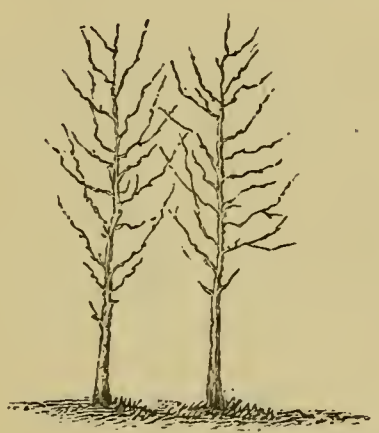


Fig. 219.

In the spring for the fifth year's growth we find it as in fig. 220, trimmed to fig. 221. From this (fig. 221) we start for the fifth year. By this time our trees are six or seven feet high, and from one to two inches in diameter at the ground. In August of the fifth year



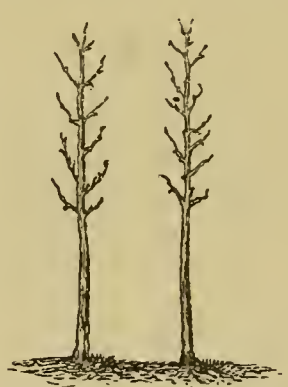


Fig. 220.—*Spring of Fifth Year.* Fig. 221.—*Same after Trimming.* Fig. 222.

we head in by taking off all side limbs up to six or seven feet, more closely than in fig. 221 ; resembling fig. 222.

We now have a row of trees resembling a row of cornstalks stripped of leaves with the tassels all complete. During the next spring after the four years' growth, with trees from two to three inches in diameter, we are prepared to commence and to connect it into a hedge. With heavy buck-skin mittens and a sharp hatchet we commence at one end of the row by hacking a tree half off or more, close to the ground, and bending it over in a straight line with the row, so that the top will be about three feet from the ground. As fast as the work is done, stakes are driven into the ground in the hedge row, from four to five feet apart, and as the trees are bent over they are braided alternately on each side of the stakes. In this way every tree is directly over the others. After all is laid and carefully woven, and each at a uniform distance apart, the few straggling top limbs are cut away. As these small stakes are unsightly to some, every fifth or sixth tree is allowed to stand to braid by, and to keep the hedge true in place. This is cut off on a level with the top of the hedge row. In this way the

standing stump grows very vigorously. Of the two modes, I prefer the stump way, as it adds more to the beauty of the hedge, and is more firm than a stake. Where stakes are used they can be taken out after the first year, as the new limbs are very compact, and as they grow they lap by and grow up between the bodies, somewhat resembling a willow basket. It is not uncommon to count fifty limbs sprouting out of a single tree the first

Fig. 223.—*Laying the Trees.*

year after being lopped. No trimming is needed the first year, but clean culture is important. Each year after the first lopping cut back within about six inches of the previous year's growth. After carefully lopping and properly weaving every tree, we have a hedge that is a beauty, and when in leaf, skirting our fields, doubly so.

Fig. 223 sufficiently represents the hedge after being lopped and made ready for the sixth year's growth. Fig. 224 is in the fall of the sixth year's growth.

From each stub near the ground several sprouts will come up. They

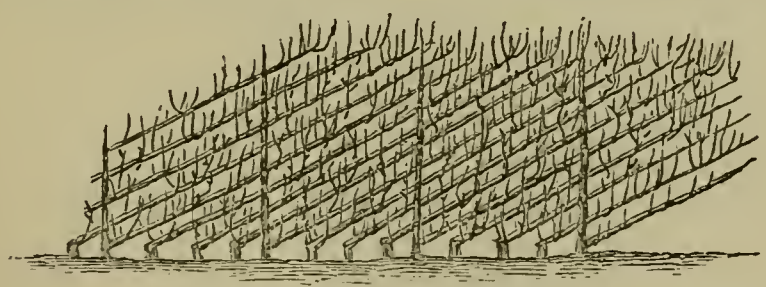


Fig. 224.—*The Finished Hedge.*

too will, as they grow, weave in between the slanting tree bodies. As the roots of the Osage naturally grow deep in the ground, care must be taken to have the hedge row well underdrained on land that is inclined to be wet. No outside sprouts away from the base of the tree, from the roots, ever appear, as some have erroneously supposed. When the hedge is built as described above, it occupies no more land for a few years than a common post and board fence. In August or the first of September of each year shear the sides, and keep the top level.

With a little care a hedge can be grown close to a gate post. Hedges made in this way have no gaps, and are found a perfect barrier to all domestic animals.

Cost of Hedge and Details of Work.

The cost of growing an Osage hedge to five years, when ready to plash, is shown by the following figures :

The cost of preparing the ground is very little where there are no stones to hinder the plowing. If there are, they must be all taken away, at least where the line is drawn, by the side of which the plants are placed at the time of setting out. Where there are no stones to be disposed of and a stubble ground is used, one plowing by turning to the left, and leaving the last furrow exactly on the desired line will be sufficient, and the furrow should be a foot deep or thereabouts, as a deep, mellow bed is needed for the young plants. This work can be done in the spring; if delayed till the fall, which is a better time for the first plowing, the frost pulverizes and makes the ground mellow. Just before setting the plants in the spring, commence to plow by throwing the furrows back by turning to the right. Passing twice may be needed to form a slight ridge. Twelve feet is wide enough for the ridge, which should be finely harrowed. If a strip is desired, now occupied by sod, fall plowing is the best, as the sod will fairly rot if stirred early in the spring, in time to set the hedge row. I think that 160 rods of ground, free from stones, can be put in the best order by one man and his team in one day's work—all told, say $3. One day's work with the hoe in cleaning and straightening the furrow made by the shovel plow, ready to draw the line for setting the plants, $1.50. Total first year, 160 rods, $4.50.

Second Year—Cost of Plants and Setting.—Usually nurserymen buy the seeds of seed dealers, who in the West buy largely from Texas, the home of the Osage. There the oranges are gathered from the native trees, rotted, and the seeds washed out from the pomace, dried and made ready for the market, I do not know the exact process of soaking the seed preparatory to planting, only that it takes several days, as the shells of the seeds are very tough.* The drills are prepared to receive the seeds, as a gardener drills for raising peas. The rows are two feet apart, so as to be cultivated with a horse-hoe or cultivator geared for the purpose. The growth the first year varies from two to three feet high. After the leaves are off in the fall, with a scythe or shears cut off within about four or five

* The seeds I used of my own raising were kept in the fruit in barrels in the cellar during the winter. In the spring, in May, they were mostly rotten. As it was very difficult to separate the seeds from the rotten pomace, I dropped them as evenly as I could in the trench rows. Those oranges that did not rot I cut apart, leaving one or two seeds in each piece. I dropped these also in the trenches, covering them all some two inches deep with very fine, mellow soil. In this way the seeds were already soaked, at least had never dried. All sprouted and were up in ten days, and made better plants than any I ever bought. Several grew over three feet in height.

inches of the ground, as a nurseryman does his seedling apple roots for grafting. Assort and tie into bundles of one hundred each, and bury in pits to keep moist during the winter, or in boxes of soil placed in cellars. In the spring these are sold to customers. During the last fifteen years or more the price has varied from $2 to $3 per 1,000. After the ground is made ready in the spring, and the plants assorted so as to have equal size and equal vitality, a man with a boy to place the plants at the side of the line, as previously described, can put in the row one-half mile (160 rods), and do it well, in one day. Sixteen plants to the rod, 160 rods, is 2,560 plants, costing, at $3 per 1,000, $7.68; labor for man and boy, $2.25—total cost for the second year, $9.93.

Cost of Cultivation each Year for Five Years.—A little more cultivation than for a row of corn is required, as the space is six feet each side of the hedge row. Cultivating and hoeing twice during the season will be —two days' work with a man and his hoe, one with horse and cultivator, $4.

Cost of Trimming.—This is stated in table published below.

Cutting Back, Staking and Plashing.—If the stems and trunks have been kept free from limbs, as previously described, two men being employed to bend the tree, the other using the hatchet, or a light, thin-bladed, sharp axe, they will plash and properly weave in between the stakes, or where one tree in five is allowed to remain uncut at the ground to use as a stake, 40 rods in a day, at $3—four days for 160 rods, $12.

Eighth Year.—After the hedge has finished increasing in height, &c., it is kept in form by side and top trimming for many years. I know of many that are ten years after plashing, fifteen years in all, that remain perfect barriers. As yet I have seen none requiring a second plashing. Two careful trimmings a year will keep all right.

Ten or fifteen years ago this mode of plashing was introduced, and now all our best hedges are of this pattern. A good cattle fence can be made without plashing, and do very well. But in the old way more or less of the plants, or trees even, will be harmed. The weaker are overcrowded and die out, leaving open places, soon made larger by the passage of cattle and hogs. By the plashing system the hog is mastered, for once at least. At the time of plashing, the trees may be eight or ten feet high even, and will better weave in between the stakes.

Recapitulation.—Total cost for 160 rods for first five years, including plashing and weaving for the sixth year's growth:

Tilling the ground for planting in perfect order,	$3 00
One day's work in cleaning out and straightening furrow,	1.50
Cost of plants and setting them out,	9.93
Cultivating five years, $4 each year.	20.00
Trimming the second year, 160 rods, two days' work,	3 00
do. third do. do. three do.	4.50
do. fourth do. do. four do.	6.00
do. fifth do. do. five do.	7.50
Cutting back, starting and plashing,	12 00
	$67.43

It must be understood that all this work has been done in its proper season. If not done then, as in most other things, more work is needed to repair delays.

It must be remembered this hedge has been protected on one side by a wooden fence, (not a stone wall, as that would shade it too much,) and neither cattle nor hogs were allowed to pass over it by getting between the hedge and wood fence while growing, ready to plash. After plashing they may try it at their pleasure, if pleasure it be.

I have followed my own experience in this statement, and carefully consulted with a neighboring farmer, who is an old resident among the first of us in Illinois, and who has done much at hedging. He fully endorses all I have said. I think that one-half of all the fences in Northern Illinois and Eastern Iowa are Osage, and all the best are plashed.

THE LILIES.

THE GENUS OF THE LILY contains some of the most showy and magnificent of all ornamental plants. The more common sorts are hardy, and will thrive in almost any soil if rich enough, and some of them grow freely under the shade of trees. Others require protection in winter. The following are some among the finest and most esteemed sorts:

GOLDEN-BANDED LILY (*Lilium auratum*), fig. 225, is a magnificent species from Japan. The flowers are often eight or ten inches in diameter, and have in extreme cases been found a foot in diameter; in color they are nearly white, studded with spots of crimson, and with a broad yellow band down the middle of each petal or sepal. The bulbs require a dry bottom, and should never be planted less than six inches deep, where they should remain several years without removal. Strong, well established plants have borne a dozen or twenty flowers, and it is said that in England a hundred flowers have been seen on a single plant. When first introduced, bulbs were sold at twenty-five dollars each.

Fig. 225.—*Lilium auratum.*

JAPAN LILY (*L. lancifolium*), is perhaps the most beautiful of all the genus. Vick says of it: "No description can do anything like justice to these flowers, or show the beautiful frost-like white of the surface, glistening

like diamonds, or the rubies that stand out on the surface." The varieties called *speciosum* and *rubrum* are nearly or quite identical; *roseum* is a little lighter; and *album* white. All the varieties are very fragrant. The bulbs are hardy.

Fig. 226.
Little Turk's Cap Lily.

Little Turk's Cap (*L. pomponium*) — fig. 226 — grows two or three feet high, with numerous very narrow leaves, and rather small, scarlet, nodding flowers, marked with black dots inside, the segments of the flower rolled back so as almost to touch at the points. This lily is less striking than many others, and is less cultivated.

Fig. 227.—*Meadow Lily.*

Meadow Lily (*L. canadense*), fig. 227, although less brilliant than some others, is remarkable for its graceful form, and as it grows and blooms freely in grass fields, it would succeed in gardens or door-yards without care, if the bulbs were removed from their native localities after the blooming season is over, but they do best in rich soil. There are red and yellow varieties.

Fig. 228.—*Lilium superbum.*

Large Turk's Cap, or Superb Lily (*L. superbum*), fig. 228, resembles the last named, but the plant is taller, and the flowers larger and more numerous. It has sometimes grown 7 or 8 feet high, while it has often borne 10 or 12, and occasionally 30 or 40 brilliant orange-red, spotted flowers. The sepals are strongly revolute. It is found in its native woods and marshes from Canada to Georgia but is not very common. It succeeds best in a deep, rich, peat-soil.

Fig. 229.
L. philadelphicum.

The Wood Lily (*L. philadelphicum*), fig. 229, is common in borders

of woods throughout the country, and is therefore one of the best of all flowers to plant in the shade of trees, although succeeding better in open ground. It usually grows about two feet high and bears a solitary, erect, brilliant reddish-orange flower, or sometimes a few together.

BROWN'S JAPAN LILY (*L. japonicum*, var. *Brownii*,) fig. 230, has a large fragrant flower, white, tinged with purple outside; broad funnel-

Fig. 230.—*Brown's Japan Lily.*

Fig. 231.—*Daurian Lily.*

shaped, five or six inches long. The plant is rare and rather expensive, and is slightly tender.

ORANGE LILY (*L. bulbiferum*, var. *aurantium*,) is a common, very hardy plant, often seen in gardens, and among the earliest, blooming in June. It grows about two or three feet high, the stem straight, furrowed, and spotted with purple, with a cob-web like down on the upper part. Small bulbs are often borne in the axils of the upper leaves. The flowers are in an umbel; brilliant orange-red. This species is variable, and runs into varieties.

THE DAURIAN LILY (*L. dauricum*, known also as *L. pennsylvanicum*,) fig. 231, resembles in form of growth the Orange lily, but bears no bulblets in the axils of the leaves; the flowers are brilliant red, three or four inches in diameter, are less dotted than the preceding, and the plant blooms a few weeks later. It is a native of Eastern Asia, and appears to be little known to cultivators.

YELLOW LILY (*L. croceum*), fig. 232, is nearly allied to the Orange lily, and by some botanists is regarded as only a variety. The upper leaves are more spreading, the petals more distinctly clawed, and it blooms later.

Fig. 232.—*L. croceum.*

Fig. 233.—*Dwarf White Japan Lily.*

The stem grows from four to five feet high, and never bears the small bulbs. The flowers are from ten to twenty on a stem, and of a brilliant orange yellow. It is hardy, and worthy of cultivation.

DWARF WHITE JAPAN LILY (*L. eximium*), fig. 233, resembles *Lilium longiflorum*, of which it is regarded as only a variety. The common variety of *L. longiflorum* is one of the most beautiful of lilies, the flowers being pure white, five or six inches long, and very fragrant. The plants are small or only a foot or two high.

Fig. 234.—*Common White Lily.*

COMMON WHITE LILY (*L. candidum*), fig. 234, is remarkable for its pure whiteness and its fragrance. It is perfectly hardy, and the plants continue to increase without care, as they remain in the ground year after year, throwing out new bulbs.

CHALCEDONIAN LILY (*L. chalcedonicum*), also called the Scarlet Martagon, bears beautiful scarlet flowers, remarkable for the regularity and graceful form of its reflexed petals. It is rather small in size, but brilliant in color. The bulbs should be planted rather deep, slightly mulched the first summer, and with a covering of pine needles or dry leaves in the winter.

TIGER LILY (*L. tigrinum*), extensively cultivated and well known, with large, reddish-orange, conspicuously spotted flowers. The stem grows from three to five feet high, and the plant is of remarkably easy cultivation. The upper leaves bear small black bulbs in the axils. It is valuable for late blooming.

THE MARTAGON LILY (*L. martagon*), has small white, yellow, red, and variously tinted flowers, which are fragrant; petals revolute or rolled back, and are very thick and firm. It is of easy cultivation.

THE WASHINGTON LILY (*L. Washingtonianum*), fig. 235, was introduced only a few years ago, but has now become extensively cultivated in English gardens, and is becoming known to florists in this country. It was brought from California. The flowers are at first pure white, with a few

Fig. 235.—*Washington Lily.*

Fig. 236.—*Great Indian Lily.*

small lilac dots, open funnel-shaped, and two to two and a half inches long. As they become older, they are tinged with reddish purple inside, and finally to a deep purplish pink. The bulbs should be planted at least six inches deep.

GREAT INDIAN LILY (*L. giganteum*), fig. 236, is a tall plant, sometimes two inches thick at the base, the leaves broad and cordate, the lower ones over a foot wide; the flowers are funnel-shaped, about five inches long, white, tinged with purple inside, and with green outside. This magnificent plant comes from the temperate region of the Himalayan chain, where it is found native at an altitude of from 5,000 to 10,000 feet.

The following kinds are easily cultivated in gardens, or are desirable for their ornamental effect:

For common and easy culture—White lily, Orange lily, Tiger lily, Meadow lily, Martagon lily and Wood lily.

Requiring more care, higher priced, but eminently worthy of cultivation—*Lilium auratum*, Japan Spotted and White lily, *L. longiflorum*, Chalcedonian lily, *L. superbum* and *L. croceum*.

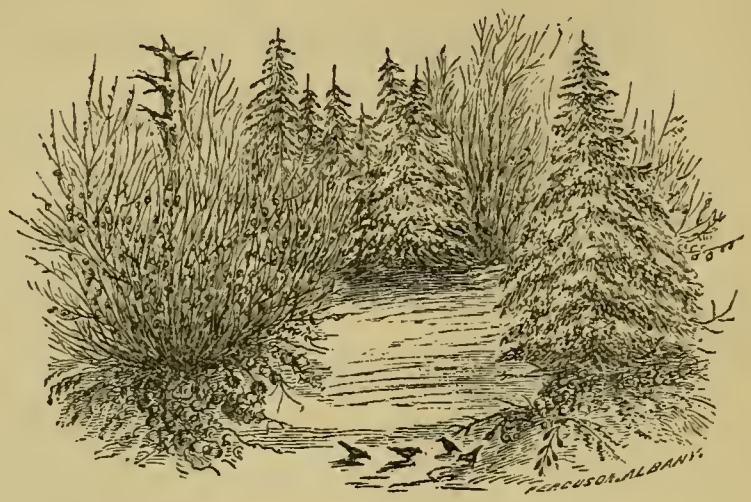
In extensive and rare collections the other species described in this article may be introduced, and some of them may become popular and well-known sorts.

Propagation of Lilies.

The bulbs of lilies are made up of scales, sometimes amounting to nearly a hundred in a single plant, but usually much fewer in number. One-fourth or one-fifth of these may be broken off from the outside without injury to the bulb. The minute latent bulb at the base of each scale may be made, by proper treatment, to develop into a new bulb. If these scales are placed into a light sandy compost, in an upright position, a little beneath the surface, in pots or boxes, with the soil pressed compactly about them, in a greenhouse or warm place in the dwelling, and kept moderately watered, they will in the course of a month or two form small bulbs. The best time for this work is during the latter part of winter. When warm weather arrives in May these pots or boxes may be sunk in open ground without disturbing the new bulbs. On the arrival of winter, cover the whole with three or four inches of leaves. In the spring they may be planted separately, and in a year or two will make flowering bulbs. This is substantially the process adopted by Peter Henderson, and other florists, for propagating by scales.

A simpler mode is to take up the roots in autumn, and pack them closely in a bed, covering with a few inches of leaves. Take them up in the spring, and remove the small bulbs surrounding the stem and imbedded in the mass of fibres; plant them, and they will soon form good bulbs for flowering. This is the easiest and simplest way to increase lilies.

Bulbs in the House.—By the exercise of a little taste a world of pleasure can be derived from the cultivation of bulbs in the house, as they can be used in almost innumerable ways. Hyacinths, narcissus and crocuses may be grown in glasses of water. Pot culture, for general use, however, is quite as good, and a little more natural. A very pretty arrangement is to plant a variety of bulbs in baskets or boxes. Fill the box with sandy soil, and if a little moss broken up finely is mixed with the soil, it will keep it from becoming packed or heavy from frequent watering. The box can then be planted with bulbs, always planting those that grow the highest in the centre, and the low-growing kinds on the edges.



THE LANDSCAPE IN WINTER.

WHILE ORNAMENTAL PLANTING has made rapid progress in this country, there has been one department which has been much overlooked—namely, beautifying the winter landscape. The foliage of deciduous trees, and the bloom of shrubbery and herbaceous plants are gone; but in their place much may be accomplished by the soft or rich or variegated shades of evergreens; by the brilliant display afforded by masses of crimson, scarlet and purple berries, and the graceful tracery seen in leafless branches and stems of silver and golden-barked trees. In the absence of other ornament, an increased fascination is given to these objects, and even when crested with snow their brilliance is rendered the more striking.

Fig. 238.—*Berries of Red Cedar.*

Among the plants and shrubs which may be employed for this purpose, the following are worthy of special mention:

Winter Berries.

The Red Cedar, fig. 238, when it grows with its wild and natural luxuriance, is sometimes profusely loaded with its peculiar hoary and purple berries, which, massed among

its dark foliage, present a highly ornamental appearance. By selecting among the young trees such specimens as indicate a prolific character, and removing them to suitable portions of the grounds, a very pleasing effect is produced.

Prinos verticillatus (known also as *Ilex verticillata*, Winter Berry and Black Alder,) fig. 239, is one of the most brilliant of all our native winter shrubs, and bears a profusion of scarlet berries, which continue through a large portion of winter. It is found in abundance in some of our muck swamps, and by selecting the best, they are easily and safely removed to cultivated upland soil, although flourishing in rich, mucky and rather moist land.

Fig. 239.—*Prinos verticillatus* (*reduced in size.*)

Rhus typhina (Sumach), bears large, dense masses of dark crimson berries, which last through winter and into spring, and if placed in the more remote parts of the grounds, and in front of evergreens, they make a fine ornamental display.

Celastrus scandens, (known by the English name of Bittersweet,) fig. 240, displays clusters of orange-scarlet fruit, which is highly ornamental late in autumn and early in winter, and continuing longer. The opening orange-colored pods (which afterwards become white) display the brilliant scarlet berries. It is a climber, and may be trained to afford a graceful and beautiful display in winter.

Euonymus atropurpureus, or Burning Bush, is nearly allied to the above, and is still more ornamental when filled with its copious crimson fruit, and is scarcely equalled for the scarlet blaze which it presents when well loaded with berries.

Fig. 240.—*Celastrus scandens.*

Fig. 241.—*Mountain Ash* (*reduced in size.*)

The Oak-leaved Mountain Ash is to be recommended not only for its scarlet fruit, but for the beauty and symmetry of the tree, the berries hanging till cut by the frosts.

Some of the wild as well as cultivated species of *Cratægus* bear showy scarlet berries, and if the most productive are selected, and made compact by pinching and cutting in, they become objects of much interest—fig. 242.

The common Sweet Brier (*Rosa rubiginosa*), with compact training, bears an abundance of red berries, which continue into winter.

Fig. 242.—*Cratægus.*

Fig. 243.—*Barberry.*

The common and purple Barberry (fig. 243) bear beautiful racemes of berries, the former scarlet, the latter crimson purple, continuing to hang until spring.

The Bush Cranberry (*Viburnum oxycoccus*), if placed in cultivated grounds, and allowed space to grow, will bear freely of its scarlet berries, remaining through winter.

The Buffalo Berry (*Shepherdia argentea*) bears profuse masses of orange-scarlet berries which continue through late autumn and into early winter. Its growth being rather straggling, it should be placed in the wilder and less formal portions of the grounds, in connection with the Pyracantha Thorn (*Cratægus pyracantha*), as they somewhat resemble each other in straggling growth ; the latter being partly tender, should be placed under the shelter of evergreen trees, where its dense clusters of red berries will present a handsome display.

The Snowberry, with its clusters of snow-white fruit. should not be overlooked, although not lasting into winter.

The English Holly is too tender for our winters ; and the American Holly is much inferior in beauty.

Photinia arbutifolia is a handsome berry shrub of California, but not quite hardy in the colder regions of the Western States.

Most of the preceding berry-producing shrubs should be placed in front of evergreens, not only for shelter, but for the strong relief afforded to their brilliant colors. As winter advances, many of them will gradually lose their

gay appearance, and some will be devoured by birds, and for the latter part of winter the beauty of the landscape will depend mostly on evergreens. On grounds of limited extent, evergreen shrubs will be chiefly planted, or the smaller trees; or if larger growing sorts are introduced, they should be kept within bounds by pinching in or pruning from the outside. Shearing should be carefully avoided, as it gives trees a stiff and formal appearance, but they should be so reduced as to present an irregular and graceful outline. The intermixture of dark evergreens and brilliant berries requires an absence of formality in planting, and they are particularly adapted to an irregular surface, rocky grounds or ravines. Sufficient care and pruning should, however, be given to the latter to induce prolific bearing.

Evergreens.

Among the smaller evergreens adapted to places of limited extent and village grounds are the following:

The Mugho pine (*Pinus mugho*), growing fifteen or twenty feet high, with numerous ascending or creeping branches, the foliage resembling that of the Scotch pine. It is sometimes confounded with the dwarf mountain pine (*P. pumilis*), but differs in shorter leaves and a more upright tree form. The Mountain dwarf pine has a more rounded growth of the tree. A very small variety of the Mugho pine grows only about two feet high. The Stone pine (*P. cembra*) although ultimately attaining thirty or forty feet, grows so slow that for many years it keeps well within bounds, and forms a neat and handsome pyramid, varied by the tufts of foliage on its outline. The Dwarf White pine (*P. strobus*, var. *pumila*) is a bushy variety of the common white pine, of a compact form, growing from six to ten feet high. Another larger variety, known as the *compacta*, is double the size of the last named, making an annual growth of three or four inches, and forming a beautiful tree.

There are several varieties of the Norway spruce (*Abies excelsa*), of various sizes, from the Pigmy Fir, a foot high, to those that become small trees. The common Norway spruce may be kept to the size of a small tree or shrub by continually cutting back; there are however two objections, one of which is the common want of skill and taste required to preserve a graceful natural form, instead of a heavy, formal or stiff figure; and the other the liability to neglect this cutting back until the tree has grown beyond the limited bounds allotted to it. The White spruce (*Abies alba*) forms a handsome tree of moderate size, growing forty or fifty feet high; and there is a dwarf variety about the size of a currant bush. A more beautiful tree is the Black spruce (*Abies nigra*), which has less stiffness and more grace of outline than many other spruces; it sometimes attaines a height of seventy feet. The Red spruce much resembles the Black, and while some regard them as distinct species, others look upon them as only varieties.

There are some other rarer firs worthy of attention, among which are the Cephalonian fir (*Abies cephalonica*), and Nordmann's fir (*A. Nordmanniana*),

the latter being regarded by J. Hoopes, author of the Book of Evergreens, as the most beautiful and reliable of all the new sorts.

Among the larger pines, none can exceed, and few equal, the common White pine (*P. strobus*), and the Austrian pine (*P. austriaca*), while the native hemlock (*Abies canadensis*) is one of the finest of all our evergreen trees, when allowed full space to grow and develop its graceful form.

Turning again to some of the smaller evergreens, we should not omit to mention the Siberian Arborvitæ (*Thuja occidentalis*, var. *sibirica*), and the Red cedar and common Juniper. The Tree Box, although a slow grower, forms a beautiful broad and dense mass of green foliage, and becomes one of the best winter ornaments. Dwarf pine (*Pinus montana*), a European species, is perfectly hardy, and easily transplanted, and grows in a dense rounded form ten or twelve feet high.

Among the trees and shrubs which contribute, by the color of their bark, to the attractions of the winter landscape, are the Golden-barked Willow, White Birch, the Golden Ash and the Red-twigged Cornus (*C. alba*), and if well relieved by a dark background of evergreens, become objects of much beauty and interest.

The leaves of the White Oak, and some other species, often remain through winter, and present various shades of red, crimson and purple. The young trees hold their leaves in rich masses; from older trees they fall in autumn.

By a due share of attention to these winter ornaments, there is no necessity whatever for the bleak and dreary appearance of which so many complain; and even the bare branches and the shining buds which invest them, will become objects of study and delight. A proper blending and contrast in various shades of different evergreen trees may be made to give additional charms to the plantings of the grounds. These examples are cited as specimens of what may be accomplished by proper care and attention.

Small ornamental undergrowth beneath the trees and larger shrubs should not be overlooked, as it gives a beautiful effect late in autumn early in spring, and when the ground is bare of snow in winter. Evergreen shrubs like the wild Yew; such small plants, with broad, thick, evergreen leaves, as the *Chimaphila*, and the evergreen ferns; the whole surface carpeted with such species of moss as give a soft, green surface, all add greatly to the effect. Among the evergreen ferns very few may be mentioned. The common Polypody (*Polypodium vulgare*),

Fig. 244.—*Polypodium vulgare.*

fig. 244, is rather small, very hardy, and will grow on or among rocks. The Hard Fern (*Aspidium acrostichoides*), fig. 245, is common along wooded ravines and hillsides, and is a large handsome plant ; also the *Woodwardias* and *Aspleniums*, and several *Aspidiums*, which may be easily collected in our wild woods early in spring.

Fig. 245 —*Aspidium acrostichoides.*

Fig. 246.—*Helleborus niger.*

Among the flowers which may be made to bloom in early winter is the Christmas Rose, so called, (*Helleborus niger*,) fig. 246, which, if planted under the protection of evergreens, and on the south side, facing the sun, may be often seen in bloom half hid under the snow.

For early spring blooming, even before all the snow-drifts are gone, plant the bulbs of the Snow-drop, Crocus, and Siberian Squill, in similarly sheltered places ; and plant such early bloomers among the wild flowers of the woods as the *Claytonia* and *Hepatica*, and they will add greatly to the charms of the grounds while all the deciduous trees and shrubs are yet destitute of foliage, and buds have not begun to swell.

TETHERING AND SECURING ANIMALS.

By L. D. Snook, Barrington, Yates Co., N. Y.

THE PRACTICE OF JUMPING FENCES by domestic animals is an acquired habit, although in a few instances that have come under my observation the impression was made that the habit was hereditary. Be this as it may, it is a reality that they do leap our fences, and the object of this article is to notice some of the best plans and contrivances for keeping them under subjection while at pasture.

First is noticed an improved form of clog or tether, as shown in fig. 247, and is made by connecting, with a chain or rope one foot in length, two round pieces of wood, each one foot in length and six inches in diameter.

The centre of the chain or rope is connected with the leg by a short chain, and a strap encircles the fetlock. The object of this arrangement is to be able to turn horses in a large pasture at noon, or at any time, and prevent them from walking about, or far from the point at which it is desired they should remain.

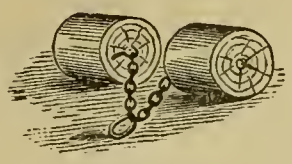


Fig. 247—*Clog or Tether.*

Another arrangement necessitating slow walking is the use of knee-hopples, as shown in fig. 248 and 249. A leather strap (a harness hame strap will answer) encircles each leg above the knee joint, and these are connected by a chain from three to five inches in length. This plan does not strain the animal; is cheap, easily attached, and is effective.

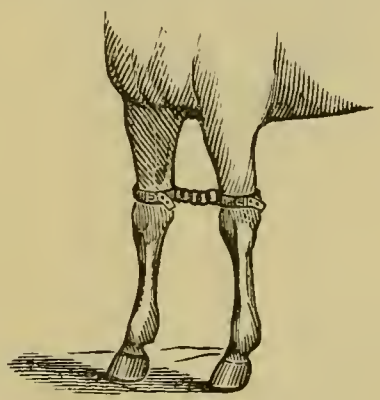


Fig. 248.—*Knee-Hopple in Use.*

I have used some of the patented hopples or fetters, but the liability of the springs and other portions to become disarranged has led some to condemn them. A cheap and

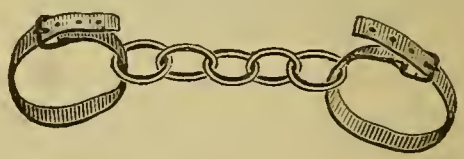


Fig. 249.—*Knee-Hopple.*

effective pair of iron hopples is made in the form shown in fig. 250. The part or band encircling the fetlock is of the usual form; one end is closed, and retains an iron ring about an inch in diameter; the other end is left open about one-quarter of an inch, into which, when the band encircles the fetlock, is hooked the ring *B*, the thin and peculiar shape at *R* allowing it to be readily attached. The ring being long, with the inserting part at the side, keeps it from unhooking while in use. The entire length of chain should be about two feet six inches. A blacksmith will charge from $1.50 to $2 for making them.

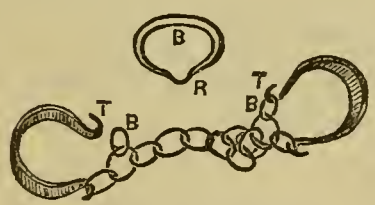


Fig. 250.—*Iron Hopples.*

Single Pendent Poke.—A poke of this form is simple in construction, easily made, and shown in fig. 251. When made light and of suitable length, it can be placed upon colts one year old, or over, with good results, and without the usual straining effects caused by the use of fetters. It is secured about the neck by an iron bolt *C*, with nut attached; or with a strap, or by a wooden pin made like a bolt, with leather or iron key. A horse-shoe nail is a good key, and is easily bent by hand. A pin of wood or iron is driven in near the bottom, and projects outward about three inches. This catches into the fence when the colt attempts to leap over.

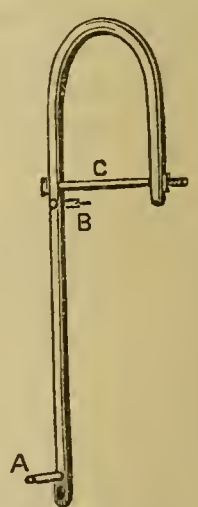


Fig. 251—*Single Pendent Poke.*

In the pendent, and two inches below the bolt *C*, and at right angles thereto, is inserted a wooden pin *B*, three-quarters of an inch in diameter, and projecting three inches, into the end of which a nail is partly driven, and then filed sharp. When the poke is pressed hard against the fence the nail enters the breast, and another attempt is not made very soon. When the animal stands in an upright position the bottom of the poke should not come nearer than one foot from the ground.

Double Pendent Poke.—In this illustration (fig. 252) two forms of the double pendent poke are exhibited, that with both pendents parallel is only an extension of the short arm of the bow of the single pendent, and may be made in the same manner, with catch pins, &c. The advantages are that the weight is distributed more evenly upon the neck, and offers more impediment to the jumper than the former. The dotted lines *D D* show another form of arrangement. It may be bent inward at the joint of bolt fastening, then diverging outward, or diverging only below the bolt as desired. This plan offers more convenience to the animal while walking or feeding, and is not liable to injure the knees when moving rapidly. If made from a round stick, unless of quite uniform diameter, the large end should be reduced in size.

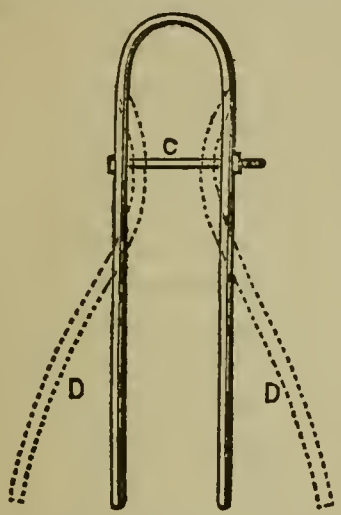


Fig. 252.—*Double Pendent Poke.*

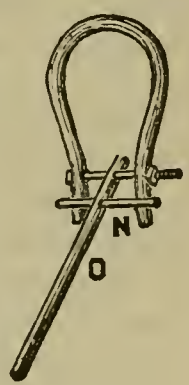


Fig. 253. *Bow and Flexible Projection.*

Flexible Projection Poke (fig. 253.)—As regards cheapness, this poke compares favorably with either of the two just described, and for effectiveness I think it preferable. In most sections of the country farmers have old ox-bows, or can obtain them of a neighbor at slight expense, and they will be found just the thing for this purpose, with the exception, perhaps, of the ends in some cases being too far apart, which is remedied by tying firmly together and immersing it for half an hour in a tub or boiler of hot water, and then allowing it to dry for a day. After removing the fastening the ends should touch—or at least within an inch or two ; and in use is readily sprung over the horse's neck. An iron bolt passes through the upper end of projection, *O*, and through the bow within five inches of the end. About four inches below the bolt is firmly driven an iron rod, *N*, one-half inch in diameter and seven inches in length, the ends of which set against the bow, keeping the projection at an angle of about 45°. This poke is readily attached, and the bow will not be lost if the remainder is. I have known extremely tricky animals, by a side movement, to throw the end of the projection over the fence, and then leap over with apparent ease, but such cases are as rare as they are provoking.

Bending Bows, &c.—To obtain a desirable, uniform curve in bending bows, a machine or form should be used, and a simple arrangement for the purpose is shown in fig. 254. The ends *B* are made from plank fifteen to eighteen inches wide, shaped in the form of an arch,

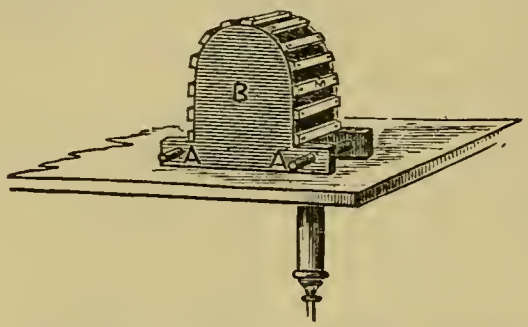


Fig. 254.—*Machine for Bending Bow.*

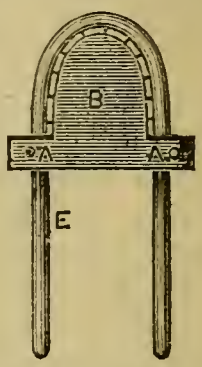


Fig. 255.—*End View of Bending Machine holding a Bow.*

with projections at each side seven inches long and four wide, through which are made holes one inch in diameter, in which loosely fit the retaining bars of wood *A A*. Over the arched portion are nailed strips of boards one foot in length, two inches wide, one inch thick, and two inches apart.

In fig. 255 is shown an end view of bending machine with stick *E* in process of bending. It is frequently desirable to bend dry and seasoned wood. In this case cut it into the desired shape, and either steam for a few hours, or immerse in water for a day or two, until thoroughly soaked, when no difficulty should be experienced in bending. If you form the bow too small, the animal wearing it is inconvenienced, if not distressed thereby; if too large, you have your remedy by winding with strips of flannel cloth, firmly tied in place. Always, and in every case, bend with the cut side inward, which in a measure prevents splintering. The material used is not necessarily confined to any particular kind of wood. Any of the tough, firm, easy-bending woods will answer. If a round stick be used, remove the bark and all projecting knots, and make as smooth as possible, rendering it more convenient to handle, not so liable to wear the hair and mane, or cause irritation. It also seasons more rapidly, and is not so frequently worm eaten.

Bad Education of Stock.—Nearly all the habits of domesticated animals are more or less a matter of education. The farmer who is uniformly gentle, will have quiet stock. The farmer who keeps more stock than he can pasture, usually has poor fences and unruly stock. If the pastures get short, young stock will learn to creep through, or jump over ordinary fences, and one or two escapes will fix the habit indelibly on the memory of the animals which thus escape. No intelligent, judicious farmer would be guilty of raising and selling unruly animals, any more than he would teach his children lying and dishonesty. An animal which cannot be trusted in fields having reasonably good fences is sure evidence of a careless owner at some period of its life.

FUNGI INJURIOUS TO FARMERS.

By Byron D. Halsted, Harvard University, Cambridge, Massachusetts.

IN THE SHORT SPACE allowed for this article, it is thought best not to go over the whole ground in a general way, but rather to treat more in detail a few of the most important species under this head.

The term *fungus* has long been applied to one of the principal groups of Cryptogamous or flowerless plants. As no fungus has anything answering the purpose of leaves, they are unable to take their food in the crude condition directly from the earth and air, and must therefore derive all their nourishment second hand in an elaborated state, either from animals or other vegetables.

The most noticeable among the common species of fungi are the mushrooms and toadstools, but as they usually grow on dead and decaying organic matter, they are comparatively harmless to the farmer and fruit-grower.

All fungi may be said to consist of two principal parts—the vegetative and reproductive organs. The vegetative portion usually consists of a number of minute threads called *mycelium*, which run in all directions through the substance from which the fungus derives its nourishment. The reproductive organs consist of small bodies, which are produced at certain times and places, and are called spores. These spores have the power of germinating when placed under favorable conditions, serving the same purpose for the fungus that the acorn does for the oak.

Without spending any further time with generalities, let us take up first what is commonly called *rust*. As this term is used in a very broad sense, and botanically includes many species of fungi, and often that which is not fungi, and also because the rusts, to the naked eye, resemble each other very closely, in treating one of these species we can give an idea of the whole, and will therefore confine our attention to one of the most common of them.

Wheat Rust (*Puccinia graminis*, Pers.)—The yellow, rusty appearance of the leaves and stalks of grain when they have been struck in midsummer is very familiar, and needs no description. Suffice to say this powder, which brushes off so easily, consists of a multitude of minute spores of the rust plant. To get a clear idea of this plant, let us begin with a spore in the spring, and trace it through its various stages of development upon the stubble and old stalks that have been left in the field. Black leaves can often be found, which at first sight pass readily for weather stains, but in cross section of the leaf or stem under the microscope, the appearance is something like fig. 256, showing that the epidermis of the leaf has broken open, and a mass of two parted spores is protruding. These double spores are

enlarged, one of which is shown at *a*, are dark brown in color, and constitute the perfect spores of the rust plant.

Beginning with these spores in the spring, when the warm, moist weather comes, they germinate by sending out an irregular tube, which produces, in the course of a few days, a number of small bodies, which are called sporidea (shown at *b* in fig. 256), the first spores in the life of this polymorphic fungus. When the spores find their way to the leaves and stalks of the wheat, germination takes place, the spores sending their germinal tubes through the stomata into the tissue of the wheat plant. After a few days of favorable weather, the surface of the plant is raised in spots, soon to become broken, and a yellow mass of spores is produced, giving the familiar color to the grain thus affected, and is the state of the fungus which has received the name of rust. This is the *uredo* form in the history of this vegetable parasite. As the season advances, these yellow, single-celled uredo spores germinate on the grain, and produce, later in the season, the last double and perfect form with which we started.

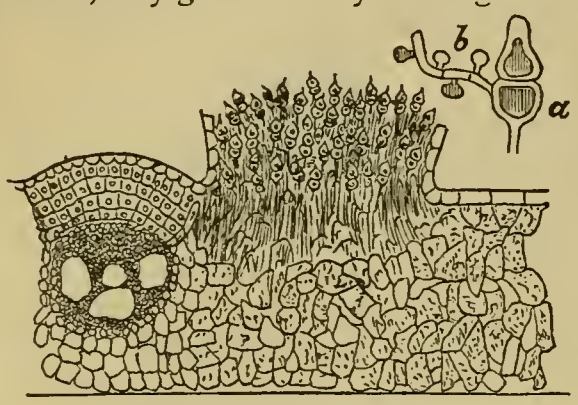


Fig. 256.—*Wheat Rust.*

The time when the greatest injury is done to the grain crop is at the time of flowering and filling of the grain, and is, of course, caused by the uredo form of the fungus. It is just at that time that the wheat plant is well filled with elaborated nourishment for the building up of the grain, and should the atmosphere be warm and moist, the rust rapidly develops, turning this stock of material, which should go to the filling of the head, into another channel, and there is produced instead a vast number of rusty spores.

Knowing the nature and history of this disease, means of meeting it will suggest themselves. The destruction of the perfect spores in autumn, by burning the stubble, would effect much. Only good sound grain should be sown, as the mycelium in the diseased grain will propagate the fungus. The use of strong chemicals for destroying the "germs" has not given flattering results, because the tissue of the parasite is better able to withstand their action than the grains themselves. Owing to the smallness of the spores, the grain-grower, with all precautions combined, cannot hope to entirely eradicate this microscopic pest from his fields when the conditions are specially favorable for its development.

Corn Smut (*Ustilago maydis.*)—Another group of fungi which grows most abundantly on various members of the grass family is, from the prevailing dusty, dirty nature, called smut. Burnt ear, chimney sweep, &c., are names given to these members of the genus *Ustilago*. It is best to treat this subject as was done with the rust, by taking one of the group, as they differ only

in minor qualities, and for this purpose we shall choose the corn smut (*Ustilago maydis*), fig. 257. This fungus, like most of its allies, usually inhabits the grains, changing them, and often the entire ear, into a great mis-shapen mass of black, dusty powder. When the season is especially favorable, it develops on almost any and every part of the corn plant. Sometimes a joint gradually enlarges, and the stalk becomes weakened and bends to the ground; again the delicate, pendant flowers of the tassel assume the size and shape of walnuts. When the black powder, which is the most conspicuous part of this fungus, is placed under the compound microscope it resolves itself into a multitude of small, round bodies, which are the spores. These spores, when they fall upon the corn plant, germinate, send in a thread and develop much as described in the rust, by branching and absorbing nourishment from the tissue through which they pass. After growing thus for a time, causing the affected portion to enlarge and become spongy in texture, it begins forming its spores in vast numbers, which finally burst through the epidermis and are discharged. The number of these spores produced in a single smutty ear is beyond computation. The great mass of them must fail to find a place to grow, while the few lucky ones come safely through the winter to continue the species.

Fig. 257.—*Corn Smut.*

As far as known there is only one form to this group of fungi, and this makes the story of its development much shorter than that of the rust.

The most effectual means of destroying this disease would be to cut off and burn all parts when they first show signs of being attacked by the smut, and in that way prevent the formation of the spores. As the smut is more a disease of the ears of the grain than the rust, greater care should be exercised in the selection of strong and healthy seed to sow or plant.

To make any steps towards the destruction of the smut effectual, there must be concerted action, and this comes among free and independent farmers only when stern necessity demands it. Until the evil assumes greater proportions, we cannot hope to see the farmers striving as in a common cause against it.

ERGOT (*Claviceps purpurea.*)—One of the most interesting of the injurious fungi is ergot, spurred rye, cockspur, &c. It grows to some extent on a large number of native and cultivated grasses. That on which it is best known, and from which it is chiefly collected for use in medical practice, is rye. This fungus (*Claviceps purpurea*) lives in the grains of the rye, beginning its work when they are quite young, and causing them to assume many times their natural size, finally becoming purplish black in color, of a horny texture and disagreeable odor. This anomolous structure

is composed of the vegetative portion of the fungus, which has fed upon the young seed and transformed its material into itself.

When some of these "grains" are placed in warm and moist sand for several weeks the reproductive organs develop in the form of long knob-like projections, in which the spores are borne in sacs, and these sacs in cavities in the enlarged ends of the projections. The grains of ergot which are used in medicine are simply condensed masses of the mycelium of this fungus, and in this state are capable of hibernating through the winter.

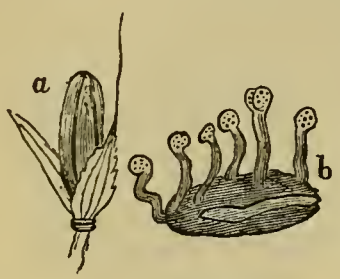


Fig. 258.—*Ergot.*

In fig. 258 is given the enlarged ergot grain at *a*, and one of the same at *b*, where the spores are being produced.

The method of working against this fungus is in destroying the ergoted grains in autumn before they have been allowed to produce their spores. A crop much affected should not be used for seed, neither should the same field be sown to rye the next year.

This peculiar fungus is a powerful poison, and in the hands of skillful practitioners has proved a valuable medicine. In countries where rye is largely eaten, poisoning with ergot, or ergotism, is quite common, and some years assumes the nature of an epidemic, sickening whole communities, causing great pain and often death. This has often occurred in Germany and other countries of Central Europe, but with us there is little to fear on this score, though sometimes it appears to such an extent on the grasses as to injure stock feeding upon it.

THE BLACK KNOT (*Sphæria morbosa.*)—The black knot grows upon the plum and cherry trees, and is one of the most destructive of fungi. As its name indicates, it forms black, warty excrescences on the twigs and branches, (fig. 259,) which are very conspicuous in the winter season, when the trees are not covered with leaves. This disease is confined to America, where it has proved a severe pest to fruit-growers. The size of the knots varies greatly, being found all the way from a few lines to several inches in length, with an average of two inches in circumference. The knot does not usually entirely surround the branch, but growing from one side often causes the branch to bend or twist into an irregular shape. The fungus first reaches the cambium or growing layer by

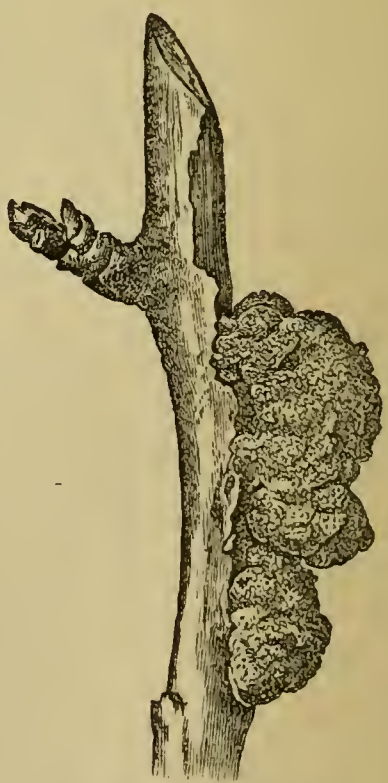


Fig. 259.—*Black Knot.*

germination of spores on the surface of the branch, or by the mycelium proceeding from a neighboring knot.

In the spring the affected portion of the branch increases rapidly in size, and the mycelium soon reaches and bursts through the bark, so that in early summer the knot has reached its full size, though differing from an old one in being still greenish in color, and solid or pulpy in consistency. As autumn approaches, the knots assume their black color, the inner portions being either destroyed by insects or reduced to a powdery mass, with only the hard outer shell left in place. In this hard crust the spores are borne in cells, always to the number of eight.

The black knot is far from being of recent origin, and has furnished a subject about which vastly more has been written than was known. Many, especially the early writers, held it to be of insect origin, while later others have looked upon it as a vegetable growth, and still others included in its production both these forms of life. During the last thirty years the insect theory has been gradually given up by entomologists, but it still remains for many fruit-growers to accept the knot as being of fungous origin. The proof given by Dr. Harlow in his paper on this subject is very conclusive: "First, the knots do not resemble the galls made by any known insect. Secondly, although insects, or remains of insects, are generally found in old knots, in most cases no marks at all are found in them when young. Thirdly, the insects that have been found by entomologists in the knots are not all of one species, but of several different species, which are also found on trees which are never affected by the knot. On the other hand we never have the black knot without the *Sphæria morbosa*, as was admitted by Harris, and the mycelium of that fungus is found in the slightly swollen stem long before anything which could be called a knot has made its appearance."

With a knowledge of the nature of this disease the remedy at once suggests itself—namely, to cut off the knots, together with the swollen portions of the branches, wherever and whenever they are found. This can be best done in autumn after the leaves have fallen. The knots should be burned, otherwise the spores will ripen the same as if the knots were left on the trees.

THE POTATO ROT (*Peronospora infestans.*)—All known species of the large genus *Peronospora* are parasitic on living plants. The one of most interest to us is that which produces the filthy decay often found in our potatoes. Perhaps no plant has caused more distress to the human family than this microscopic parasitic fungus. But little was known of the rot previous to 1842, when it played so destructive a part in potato culture, only to eclipse its former achievements in 1845, a year memorable in the history of many countries as that of famine, especially in Ireland, where potatoes were the leading source of food for the masses. Since that year the fungus has not been so prevalent, though to some extent found almost every year.

The rot makes its appearance about mid-summer, when the potato plants

are growing the most vigorously, and is first noticed on the under side of the leaves, in the form of a slight frost, rapidly spreading, and turning the foliage brown as it passes along. Like all parasitic fungi, the mycelium is stealing its way through the tissue of the plant, passing from the leaves to the stem, and from the stem down into the tubers.

Fig. 260 represents a cross section of a leaf much magnified, with the fungus running among the cells, and finally passing through a breathing pore, (stoma,) branching very irregularly and bearing the sporangia at their tips. It is this branched exterior portion which gives the frosty appearance to the naked eye when the leaf is first affected. These sporangia fall off on other leaves, and the spores inside soon come out, germinate, and produce new plants in a few hours, and in this way the disease is rapidly spread from leaf to leaf.

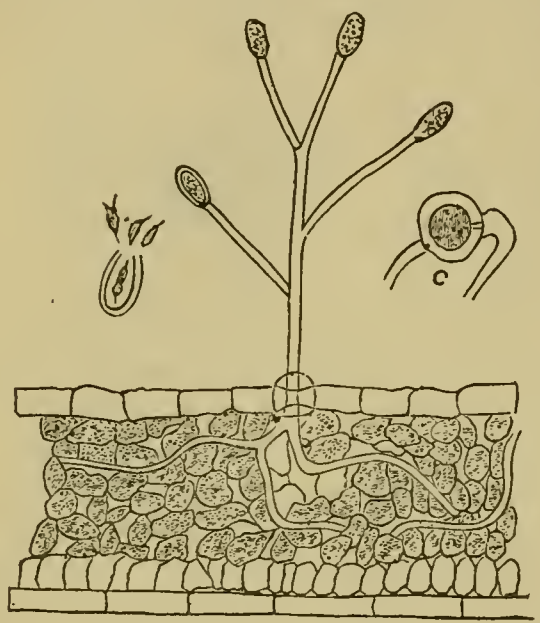


Fig. 260.—*Potato Rot.*

In many other species of this genus a second form of reproductive bodies, called resting spores, is known, and the work of finding them in the potato rot has been long pursued. W. G. Smith of England was the first to describe them, for which he has received a gold medal from the Royal Horticultural Society of England. The importance of finding them resides in the fact that they are the spores which are designed to carry the fungus through the winter. The finding of them, and the place in the potato plant where they are produced, is an important step towards controlling, to some extent perhaps, this dreaded disease. Mr. Smith finds them in the leaves of the potato, and they agree in general structure with those of the other species of the genus. They are sexual, or formed by the union of the contents of two cells. Fig. 260, at *c*, shows the process, one thread ends in a large end filled with protoplasm ; this is met by another and much smaller one, which penetrates the coat of the larger one, and discharges its contents into it, after which the discharged one or male perishes, and the other, the female, produces a resting spore.

Some persons have held strongly to the belief that the rot is of insect origin, but they have usually been those who have a deep interest in some "sure cure" or "dead shot" which they wish to introduce into general use. When it can be sown and grown on healthy plants with such certainty as numerous experiments plainly show, it is time to believe it is as much a plant as the one on which it grows.

The farmer is perhaps more interested in the remedies than any farther

details about the fungus itself. Nothing but general suggestions can be given. As far as experience goes, the early varieties do best, as they get through the most critical period of their growth before the fungus appears. None but healthy tubers should be planted, otherwise the parasite will be planted with the potato. Plant on new ground, or if on old, not where potatoes which rotted grew the previous season. Plant on naturally dry or well drained soil. Dig the potatoes as soon as the rot appears on the leaves, and thus save what there is, rather than run the risk of losing all, besides propagating the disease. Always burn the tops and all affected tubers. Keep the potatoes in a dry, cool cellar.

With these suggestions, and others which will come to the reader, much may be hoped to be accomplisbed towards diminishing the potato rot; but until we can command the weather, warmth and moisture, the prime conditions for the development of the fungus will be beyond our control.

NOTES FOR GRAPE GROWERS.

Training and Pruning.

GRAPE CULTURISTS are well aware that good grapes may be raised in either of the different modes adopted for pruning and training, provided sufficient space is given for the free growth of the shoots, and for the development of the leaves, and that not too many branches are allowed to exhaust the vine and to interfere with each other. But it is a matter of importance on the score of economy and simplicity in mangement, and of uniformity in growth, to choose some modes in preference to others. The following, kindly furnished by Henry Wood of Westchester county, N. Y., a successful amateur grape grower, is particularly intended to equalize the flow of sap and the growth of the shoots on each wire, by bringing up separate stems from the ground; and to simplify and improve tbe pruning by renewing all the bearing wood annually. This is effected by care in training upward the shoot nearest the vine, to secure a strong growth to lay in the next year; whereas all the other shoots are allowed to hang free from each other. This method improves the fruit on the shoots thus allowed to hang, and promotes the growth of those trained upward. "The process," says Mr. W., "of pruning is exceedingly simple. It consists in cutting out the last year's bearing wood to the 'heel' shoot, and laying that in its place; and in continuing to do this every year. Occasionally from accident or tardy growth, this shoot will not be sufficient; the course then is to spur it and others, until you come to one which will reach out to a point half way to the next vine, or near it. With me the heel shoot is usually long enough for the purpose. My vines cultivated in this way are mostly Concords and Hartfords. They are planted 12 feet

by 14 feet distant. If the ground is good, Concords should be 14 feet apart in the rows, and 8 feet between. My vines do remarkably well, seldom failing to ripen heavy crops of excellent grapes of their kind."

The accompanying cuts show the successive stages of management. At *A*, fig. 261, is the young plant, set in a depression, so that when the buds

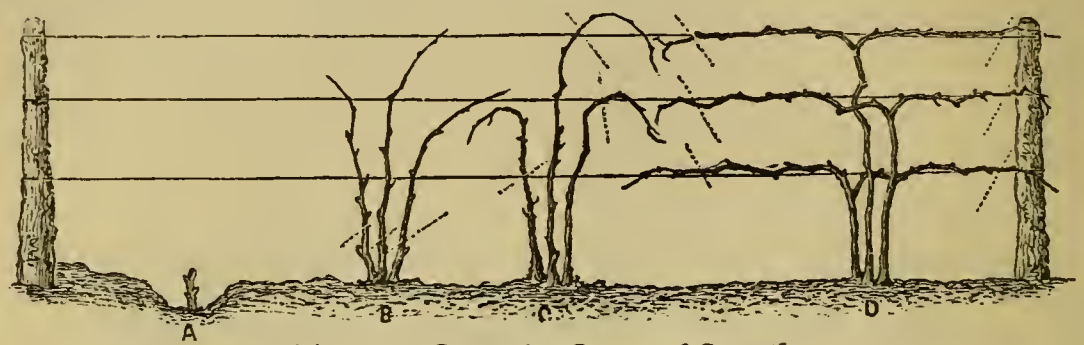


Fig. 261.—*Successive Stages of Growth.*

have sent up three strong shoots (the rest being rubbed off as soon as they start) the hole may be filled level, and three distinct vines be thus obtained, growing closely together, as shown at *B*, which represents the triple plant at the close of the first season. The following spring each is cut down at the places shown by the dotted marks, and a strong shoot trained from each the second season, which will give results shown at *C;* that is, three strong canes will be supplied at the end of the second year. The following spring these are cut at the respective heights intended for them to reach, as indicated by the dotted marks. The horizontal training is now commenced, by leading two horizontal shoots from each vine, so as to supply the three wires, as exhibited at *D*. These may be permitted to

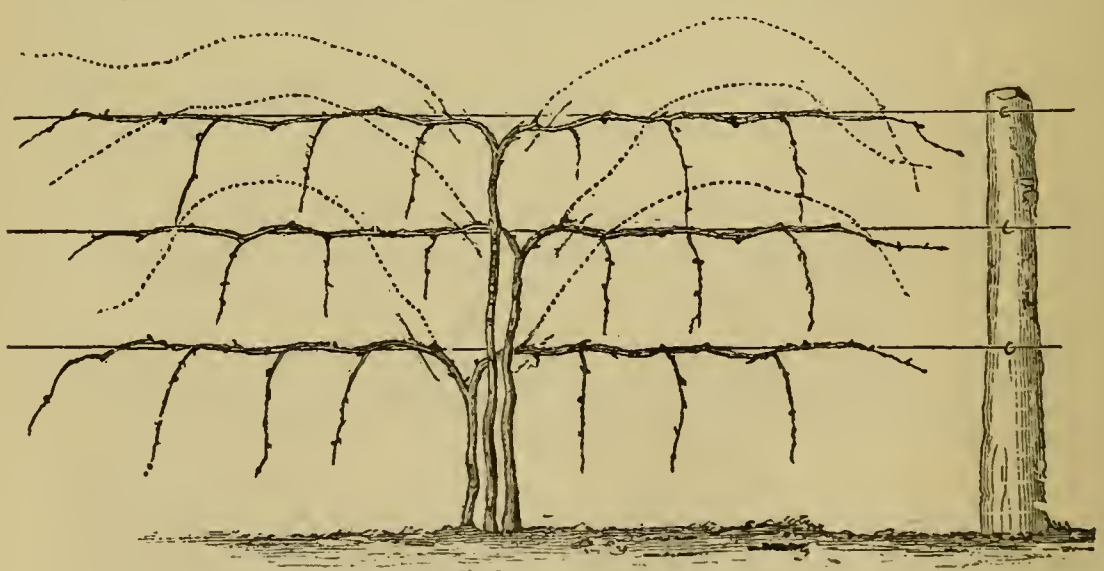


Fig. 262.—*Completed Training.*

bear a few grapes, but the crop should be a very small one. The following spring they are to be cut to about half their length.

Fig. 262 represents, on a larger scale, the vines the fourth and subsequent years ; and if the growth has been strong, they will have extended

enough the fourth year to cover the fourteen feet of the wires, but it will often require longer time. Here again, in this figure, the dotted marks show where the bearing vines are cut in spring, after bearing the previous year. The drooping shoots bear the bunches; the long dotted lines indicate the position of the one-year canes, to be brought down to the wires for bearing the next crop.

By this process, each of the three wires will sustain an equal weight of the vines and grapes, without the tendency for the vigor of the single plant to push towards the top.

A Wooden Trellis.

In small gardens where a few vines are raised for family supply, it is sometimes inconvenient to adopt the wire trellis used in large vineyards, which require tightening and relaxing as the temperature of the seasons changes. In such cases a neat wooden trellis is more convenient, and needs no bracing of the posts. We have found the following to answer a good purpose, and to be cheap in construction:

Procure yellow cedar posts 8 feet long, (or longer if to be had,) set them 2 feet in the ground, pounding the earth very compactly about them. Then nail on the horizontal rails, which may be of thick inch boards, 2½ inches wide. We have taken selected hemlock, the thickest that could be found, and had them slit by a machine—or the work may be easily done by hand. They are 16 feet long, and the posts are set at this distance apart. In order to render the trellis stiff and firm, without intermediate posts, we nail two

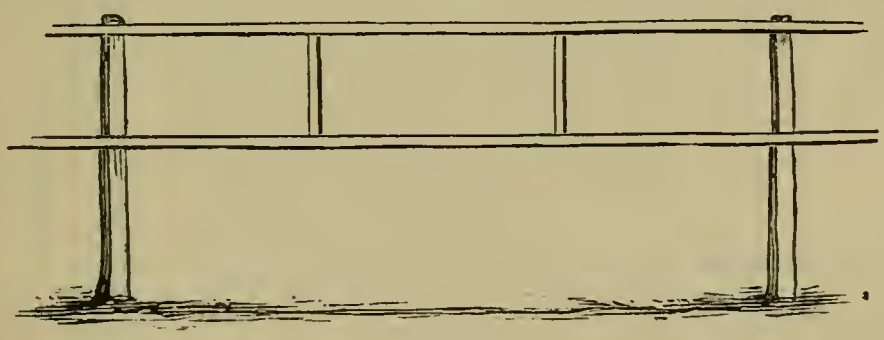


Fig. 263.

upright pieces of lath, as shown in fig. 263, using clinching nails. The upper rail is about 6 feet high; the lower 3½ feet high. The boards are rough, not planed, and when the trellis is completed, two or three heavy coats of crude petroleum (the light is best, penetrating better, but either will do), applied with a whitewash brush, thoroughly soaks every part, and renders them as durable as red cedar. The petroleum gives a light brown color, which is least glaring or obtrusive to the sight. A more finished trellis may be made by planing the boards and painting a light olive, or a light, unobtrusive brown. The rough trellis may, however, be made very neat in appearance, and the cost is about as follows, for ten rods in length: Eleven posts, 25c. each, $2.75; twenty strips of board, 8c.

each, $1.60; setting posts, $1.50; nailing and oiling, $1; total, $6.85, or 68c. per rod.

If a stronger and more finished trellis is desired, three horizontal rails, instead of two, may be employed, with three vertical braces, as shown in fig. 264. By increasing the number of rails and braces, they may be made more slender, and present a lighter and more graceful appearance. Or by making them of 1¼ inch or 1½ inch stuff, they may be correspondingly narrower, and all appearance of heaviness avoided.

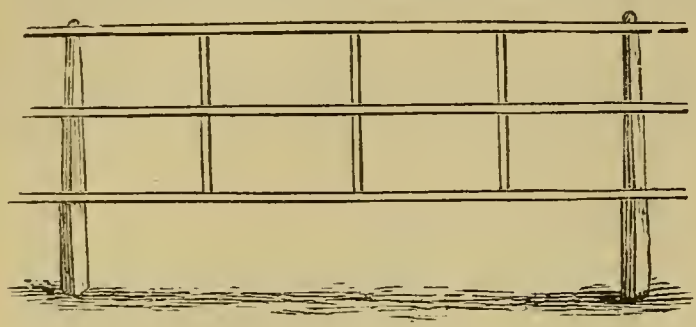


Fig. 264.

ADJUSTING TRELLIS WIRE.—We lately examined a simple and excellent contrivance for stiffening or relaxing the wires of a grape trellis, in the garden of Dr. S. B. Woolworth of Albany, N. Y., of which we give the accompanying representations. Each wire is fastened to the end of a short lever, *A* (fig. 265), which is mode of stout half-inch board, about 2 inches wide and 10 or 12 inches long. This lever is secured to the post *A* by a strong screw at *B*, and this screw serves as a fulcrum or pivot, on which the lever moves when the wire is stiffened or released. In whatever position it is placed, it is secured by a nail *C* driven into the post. This contrivance may be varied by inserting the screw at the end of the lever, as in *A*, fig. 266, and attaching the wire between the nail and the screw. Or, it may be fastened at the lower end, as in *B*, as may be found most convenient, the essential characteristic remaining the same. Any gardener of moderate skill can make a large number in a day, and they have cheapness, neatness and convenience to recommend them. They would not probably answer for wires of great length, but when only a few rods long, they perform all that is required.

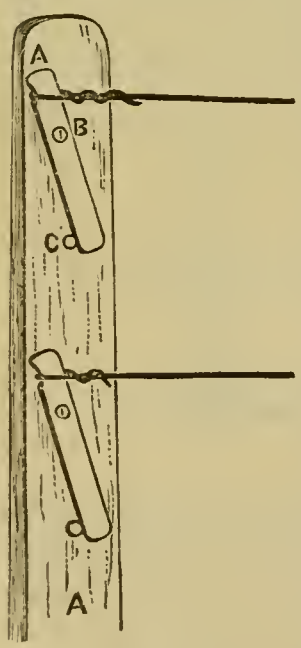


Fig. 265.

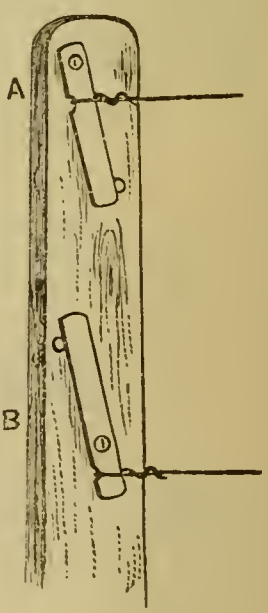


Fig. 266.

COMPARATIVE HARDINESS OF GRAPES.—A correspondent of the Rural World gives the following classification of grapes according to their

hardiness: First, or most hardy, Concord, Telegraph, Perkins. Second, or next hardy, Clinton, Hartford, Delaware, Isabella, Catawba, Martha, Northern Muscadine, Ives. Third class, Creveling, Goethe, Lindley, Maxatawney, Alvey.

THE FLEA-BEETLE.—C. V. Riley, the entomologist, says that the larvæ of this little insect, which are sometimes so destructive to the leaves of the grape, are most easily and effectually destroyed by the application of dry lime, thrown on them by means of a common sand-blower or bellows. This is better than lye or soap-suds, and does not injure the leaves.

KITCHEN GARDENING.

RAISING ASPARAGUS.

ONE OF THE ERRORS in asparagus culture is crowding the plants closely together in the bed. A deep excavation is made, which is filled with rich materials, and the gardener, in order to get the most of the narrow space which has cost so much labor in preparing, sets the plants so near together that they crowd each other in growth, preventing their free development. We have urged on former occasions the superior advantages of giving less attention to preparing a deep bed, and allowing more space for their growth. The largest plants we ever saw were those that were thus allowed abundant room, with only the common depth of good garden soil. A gentleman whose garden we have occasionally visited, and who knows well how to provide the finest vegetable luxuries for his family, gives us the following details of his management of asparagus:

The plants in the first place are set about one foot deep; the shoots in a properly treated soil readily find their way to the surface. (Fig. 267.) The

Fig. 267.—*Asparagus Plants, set a foot deep, 6 feet apart in the Rows.*

rows are 6 feet apart, and the plants are set 3 feet in the row, (fig. 268.) The ground is cultivated and kept clean through the summer. In autumn,

after growth has ceased, and the stalks have been cleared away, two furrows thrown apart are plowed with two horses right over the crowns of the plants. The wide furrow thus formed is filled to a depth of 5 or 6 inches with

Fig. 268.—*Asparagus Plants, (plan,) Rows 6 feet apart; Plants 3 feet in Row.*

old, well-rotted manure, (fig. 269,) and the soil is then plowed back, covering it, (fig. 270, next page.) In alternate years superphosphate is applied at the rate of half a bushel to fifty running feet in a row, instead of manure—

Fig. 269.—*Double Furrows, Plowed in Autumn, over Asparagus Rows and Filled with Manure.*

both together would answer well. With this treatment each year, the plants will have attained a full growth in five years, and each plant becomes a stool of shoots fully two feet in diameter. One of these stools

has thrown up no less than two hundred shoots, some of them an inch and a half in diameter. An essential part of the treatment for the preservation of the vigor of the plants, is to cut the shoots for the table only from alternate rows in each year. This prevents exhaustion.

Fig. 269.—*Manure over Crowns after Covering with Plow.*

In running the deep furrows over the crowns of the plants, as already described, if the crowns or the roots happen to be torn, no harm results, but rather benefit, the plants being at that time in a dormant condition. During the growing season, care is taken not to injure them, and the rows are cultivated with a horse, and kept clean like a common cornfield.

The gentleman whose practice we have described, remarks: "The objects in manuring in this manner, instead of broadcast, are the following: 1. The finely decomposed manure is a light material for the shoots to force through, which is important in heavy soils where much time is consumed by the plants overcoming their resistance. For the more quickly the shoots reach the surface, the more tender and finely flavored they become. 2. When the manure is applied broadcast at first, a ranker growth of weeds is produced. 3. Broadcast manuring being usually done in autumn, and left on the surface, it makes a harbor for moles and mice, which do serious damage by eating the crowns. 4. The plants feel the manure more quickly. Superphosphate and guano, in as close contact with the crowns as this treatment places them, do not injure the plants. The body of the soil where the lateral roots run is fertilized by the old manure thrown out by the plow the following season.

This plan is recommended to produce asparagus of the finest quality for the home table; and if it is marketed, will command a price, from those who appreciate it, repaying the expense.

"Many families who spare no expense in having their tables supplied with every luxury, who grow their early cauliflowers and lettuce under glass, and who are exceedingly fond of asparagus, never have this prince of vegetables of even medium quality."

SUPERPHOSPHATE ON ASPARAGUS.—Peter Henderson says he has found superphosphate of lime very useful as an application to asparagus beds, at the rate of 500 pounds per acre (which would be a little over three pounds to the square rod), sown on the beds and hoed in. When tried on alternate rows, the difference was nearly a foot in the height of the stalk in favor of the phosphated rows; and the crop was nearly double when cut the following spring. This experiment is easily performed by those who have superphosphate on hand, but the same degree of success is not to be

expected on all soils. We have known other crops to be equally benefited by the application of this fertilizer in one place, while the effect was imperceptible in another neighborhood not six miles distant, with no visible difference in the character of the soil.

EXTENSIVE CULTURE OF EARLY TOMATOES.—J. Peirson of Genesee county, N. Y., who raises annually many acres of tomatoes for canning, finds the two best to be Conqueror and Hathaway, the former proving as early or earlier than the Hubbard—larger, smoother, and a better grower. They were beginning to ripen in the open ground about the middle of July. The course pursued in raising tomatoes is to plant them in a hot-bed in February, or rather in a simple propagating house, the beds made of manure, like a hot-bed, for bottom heat and artificial heat used to keep the air warm above them. In a month the plants are taken up and transferred to small tin boxes, made by cutting refuse cans in two (covering the hole with a small chip), which in this way cost nothing (fig. 271.) In May they have become strong plants, and are set in open ground, with all the earth and roots adhering together, and continue to grow without any check. The best crops of tomatoes yield 400 bushels per acre; none go below 200 bushels.

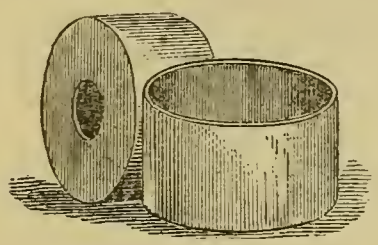


Fig. 271.

MUSKMELONS FOR MARKET.—The muskmelon is successfully cultivated for market by E. P. Bowen and H. C. Howard, enterprising young fruit raisers of La Salle, N. Y. Their practice is to start the young plants in a cheap greenhouse, by planting in boxes 3 feet long, with ten divisions in each, these divisions being 3 inches square in the clear, and 2½ inches deep—fig. 272. If larger, they would succeed rather better, but the boxes would in that case occupy more room in the greenhouse. When the plants have made three or four leaves they are set out in open ground, by prying off one side, fig. 273, and sliding out each plant with its mass of fibres and roots, and setting it where it is to remain. These plants remain stationary for about a month after setting, when they again begin to grow, and soon make rapid progress. When we saw the plantations, in July, they

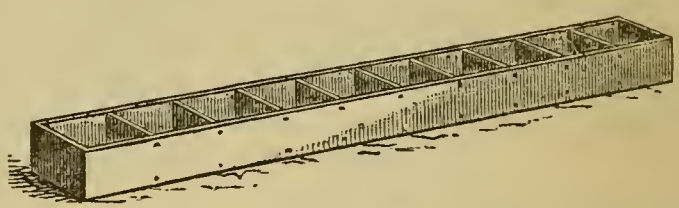


Fig. 272.

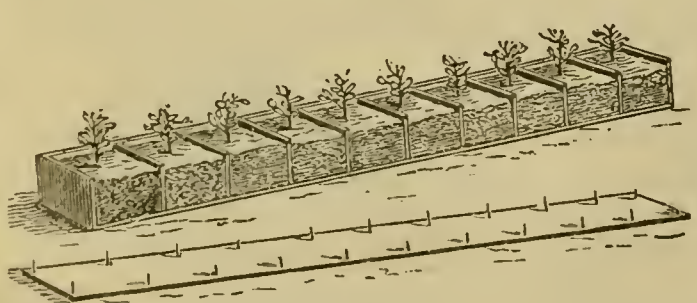


Fig. 273.

had covered the surface of the ground with runners and leaves. A large variety of the green nutmeg is planted for this purpose. The sales amount to from $200 to $400 per acre.

EARLY POTATOES.—Potatoes may be planted as soon as the frost is out of the ground, and will not be injured if white frost does come after they are up. We make a gain of at least one week in early garden potatoes, by starting them in the end of a hot-bed, setting them out in rows in open ground after they are furnished with green leaves. In one case a white frost cut the tops afterwards, but there were enough left for the plants to grow and give a good crop. They might be protected by newspapers when frost is threatened. The cut pieces were placed in contact in the hot-bed, and buried an inch or two in depth.

POTATOES PLANTED DEEP.—We tried the experiment one year, on several alternate rows of potatoes about thirty rods long, of planting a part about two or three inches deep, and another part five inches deep. The latter invariably produced about 20 to 25 per cent. more potatoes, the treatment in every other respect being the same. They were cultivated flat, which always gives more than when ridged.

PROFITS OF VILLAGE GARDENING.—A correspondent of the American Agriculturist gives a statement of his experience in a garden of one-twelfth of an acre. He is a dry-goods dealer, and does the work with his own hands, out of business hours. He began solely to raise vegetables for family use; but by thorough cultivation and very early crops, he sold $73 worth besides. He used an abundance for his family, and gave away largely to his neighbors. Doubtless the health which his exercise has afforded has been worth more than the sum for which all his crops would have sold. He does not give the causes of his success, but we have no doubt it was by using plenty of manure, worked and re-worked into the soil, entire freedom from weeds, and a selection of such crops as afford the best profits.

BEST GARDEN VEGETABLES.—A. S. Fuller gives, in the Rural New-Yorker, the results of his experience with garden vegetables. For tomatoes he found the Conqueror and Canada Victor good, very early sorts; for a general crop nothing is equal to the Trophy. For cabbages, Early Wyman and Early Wakefield are good; he would plant the Winningstadt for market, although poor in quality, it always gives solid heads. For winter sorts he prefers Fottler's Improved, Brunswick and Curled Savoy. Among beets, none excel the old well-known Bassano for early, and the Long Blood for a late sort. With peas, after trying many sorts, he comes back to the old Champion of England. For early market, Dan O'Rourke, Carter's First Crop, "and similar tasteless sorts," he thinks will do well enough for city people.

THE BEST ONIONS.—From a report furnished us by Prof. Beal of the Michigan Agricultural College, it appears that experiments have been made on the grounds of the college with a large number of new and old varieties of onions. From these experiments, Prof. B. recommends as most

valuable, the Red Wethersfield and Early Red Globe, for red onions; although not quite so good in quality as the yellow and white varieties, they yield and keep well, and are rather more hardy. For yellow onions, the Yellow Danvers and Improved Large Yellow are best. The white sorts are most delicate, and need careful handling; the best are White Globe and White Portugal. The Giant Rocca, Southport, Late Globe, and Giant Madeira, were large and productive, but did not ripen.

LARGE SEED BEST.—Experiments have been made at Halle and Leipsic, showing the superiority of large-sized seeds for garden vegetables. Beans and peas were tried with large and small seeds side by side. The plants from the large seeds were earlier and grew more rapidly, and there was about one-tenth in the difference of the crops in favor of the larger seed. The large seeds also germinated with much greater certainty. In the experiments, an equal number of living plants were taken.

SOAKING SEEDS.—W. R. Lazenby, of the horticultural department of Cornell University, has made a number of experiments, and finds that by sprouting garden seeds before sowing, there is a gain of three or four days in the time of ripening.

NOTES IN FRUIT CULTURE.

HOW TO RESTORE NEGLECTED ORCHARDS.

A CORRESPONDENT of the COUNTRY GENTLEMAN has made inquiry for the management of a neglected and browsed young orchard, of which he had lately become the owner; many of the trees with the

Fig. 274.

Fig. 275.

distorted tops and suckering bases shown in fig. 274 and 275, and some worse, or with three or four stems from the bottom. As this orchard had been entirely neglected, the first great point was to impart vigor to

the trees by good cultivation and manuring on the whole surface of the ground. Hoed but not sown crops may be raised between the rows. Next, the trees should be properly pruned, early in spring, and never while in leaf. In fig. 274, all the suckers, *A B C*, may be closely cut away, and the long outside branches shortened in so as to make a neat, handsome head. In fig. 275, more care will be required. In addition to the removal of the suckers, the top branches may be cut off at *A* and *B*, leaving *C* for the top; and if there are good buds at *A*, they will be likely to throw out new shoots, and give a better shape to the head. Or cut off the right shoot just above *A*, retaining the small brush. Where the original stem is crooked or unthrifty, cut it entirely away, if a straight, vigorous sucker can be found to take its place.

By such treatment, you will in a few years have such fine trees as in fig. 276; if, on the contrary, the orchard is left in continued neglect, it will give old trees like fig. 277.

There are two precautions to be observed in pruning and in cultivating the ground, so long as you wish to preserve or increase the vigor of the trees,

Fig. 276.

Fig. 277.

namely, never to prune while the buds are swelling or opening into leaf, nor while growth continues; and never to plow among the trees during the same period, when breaking the roots would tend to check growth. Surface cultivation should only be adopted at such times. When the trees are dormant, pruning tops and roots will do no harm.

Keeping Apples for Daily Use.

The question is often asked, what the best way is to keep apples for common family use. We have found central shelves in an apartment set off or devoted to this purpose, the most convenient. The apples are spread on these shelves, only a few inches deep, so that they may be readily examined or picked over, as fast as decay commences on any specimens.

It is very important that the apples be kept as cool as practicable after gathering in autumn and before the freezing weather of winter arrives.

For this purpose they are placed on the floor of an out-house facing the north, and allowed to remain there till about the time that freezing weather commences, when they are removed to the shelves of the fruit-room in the basement of the house. This fruit-room (which is about 10 feet wide and 30 feet long) is separated from the rest of the basement by an 8-inch brick wall, and has a cement bottom to keep the air dry enough. Windows for ventilation are hung on hinges, so that they may be opened or closed to any desired degree, for the regulation of the temperature by the thermometer. The nearer this temperature is to freezing, the better the fruit will keep. When the weather is warm outside, the windows are closed to exclude the warm air; when colder, they are opened sufficiently to admit cool air and keep down the temperature.

The apples being thinly spread on the shelves, any decaying specimens are readily detected and removed, care being taken *not to disturb or tumble over the sound apples which remain.* An examination every few weeks during winter and spring will keep the supply clear of rotten apples.

Among the advantages of this mode is the readiness with which the specimens which will not keep are separated from the others, and only long keepers allowed to remain. When fruit is kept headed up in barrels, which is a common mode, this selection and separation cannot be made; and while they keep better thus excluded from the air so long as all remain sound, the commencement of decay in a few specimens soon spoils all the rest.

A little practice will enable the attendant to remove those specimens which will not keep, even before decay begins; and by going over the shelves several times during winter and spring, none but sound, long keepers are left.

As warm weather approaches, and it becomes more difficult to keep the apartment so cold as may be desirable for the fruit, a portion of the soundest and hardest are selected and placed in shallow boxes and shoved under the lower shelf, on the bottom of the cellar. The cold cellar bottom keeps them at a low temperature, and the shelf above serves as a cover to prevent air currents. In this way we have fresh specimens of such fruits as the Baldwin and Rhode Island Greening at the middle of June, and we sometimes keep fine, hard, fresh Greenings into the month of July.

The three leading requisites for success are—1. Placing the apples in a cool out-house in autumn till freezing weather. 2. Removal of decaying specimens from the shelves. 3. Keeping the temperature as low as practicable without freezing, by a proper adjustment of the hanging windows.

Gathering and Packing Fruit.—An excellent paper on this subject from E. H. Benton of Le Roy, although furnishing directions well known to our most successful fruit-growers, gives some hints worth repeating in condensed form:

In picking, make two grades, or even three, but never put imperfect fruit

along with good, as it reduces the whole package to the grade of the poorest. It does more—the good makes the poor appear much worse than it really is, by contrast. Medium fruit will sell well, if all the fine specimens are taken out. The *hand* is the best of all machines ever made for picking—hence the importance of step and other ladders to make all parts of the tree accessible. To save labor, put the fruit in barrels *in the orchard*, and head up before it is moved—then placing it in an out-house till cold weather. In this way time is saved, and bruising avoided. Or the barrels, when headed, may be placed on their sides on rails in the orchard till removed to the cellar. Mr. B. says, "It costs no more to ship a barrel of No. 1 apples one hundred miles than a barrel of windfalls, and any fruit-grower would make money if he rejected one-half his crop, if necessary, to get his barrels filled with sound, fair, salable apples, if he got nothing for the rejected half"—although they may be used to feed animals, or make vinegar. He farther adds: "We do not believe the time will ever come when good apples, rightly picked and packed, will go long begging for a market in the hands of a man *known* to fill a barrel just as he heads it, and who marks the outside exactly as the contents prove on opening it."

Apples for Southern Ohio.—The following list of varieties is recommended in the Ohio Horticultural Report:

Early Harvest, Red Astrachan, Golden Sweeting, Benoni, Trenton Early, Primate, Williams' Favorite, Jefferis, Gravenstein, Maiden's Blush, Porter, Rambo, Ben Davis, Smith's Cider, Rome Beauty, Hubbardston Nonsuch, Winesap, Milan, Jonathan, Tallman Sweet, Dominie, English Russet, Peck's Pleasant, Limber Twig, Jersey Black. The finest apples were raised in orchards where hogs had been kept for a number of years.

Quaint Names.—Several varieties of the apple seem to have been rather unfortunate in the names they have had to bear, and show the importance of attending to a good nomenclature at the first. Among these are Long John, Lopside, Hog-pen, Wild Cat, Sheepnose, Ram's-horn, Jolly Beggar, Pucker End, Betty Brooks, and Old Betty; while the following may be of a more pleasing character, namely, Bachelor's Glory, Fair Maid, Polly Bright, Fail-me-never, Better-than-Good, Sweet Doctor, Sack-and-Sugar, Burst Open, and First-and-Last. All these names will be found in our fruit books.

Horticulture in Schools.—Every teacher of a district or common school should know enough of budding and grafting to teach the scholars by practical lessons. The leading principles of vegetable physiology, as taught in Gray's First Lessons, may be understood by any intelligent teacher in the course of a few days, in connection with a little voluntary field practice. Young students may understand a great deal about germination by planting beans, peas, corn, wheat, &c., and examining the progress of the young shoots every day. They can try the effect of planting at different depths at the same time. They can trace the length of roots from young trees. A few ligatures about the limbs of trees will show them

much in relation to circulation, in the course of the summer. Every teacher should show his pupils how to bud and graft, and to raise plants from cuttings and layers. He should explain the principles to them on which success depends. He will find much to assist him in vol. VII, page 236, of RURAL AFFAIRS. He will find enough for his purpose in relation to germination and other processes in vegetable physiology, on page 144 of vol. III, of the same work. These things should be well understood by both girls and boys; they will not only prove attractive and interesting, but be useful all their days. Young men spend years in the study of Latin and algebra, which are useful; but one-tenth of this time given to the fascinating and useful arts connected with vegetable growth, would be more valuable for the time devoted. Young ladies study French and crayon work for years, but if they could cut off a few fragments of this time, and give them to some of the arts connected with horticulture, it would be better for their health, their minds, and add much to their usefulness.

FRUIT AS MEDICINE.—Many years ago a chronic cough induced us to look into medical books for the best expectorants. Dr. Good stated that ripe raspberries were one of the best remedies of the kind. As it was then approaching mid-summer, we obtained a daily supply for some weeks. We found them quite an agreeable medicine to take. They cured the cough. Again, at a late meeting of the Western New-York Farmers' Club, Wm. H. Pillow of Rochester said he had been in the small fruit business several years, and he believed that strawberries had saved his life. One spring, after severe sickness, he had no appetite till strawberries came, when he almost lived on them, and improved rapidly. Land-owners, plant strawberries and raspberries!

CANKER-WORM PROTECTOR.—The following contrivance, described in the COUNTRY GENTLEMAN, by J. H. Blaney, is an improvement on a similar one described in RURAL AFFAIRS, vol. VI, page 231, (where *tan* was misprinted "tar,") and can be made for about half the price:

Having succeeded the past six years in controlling this orchard pest, I write that others may do likewise. My plan is to have a wooden box, with a gutter containing oil, tar, or printers' ink; something that will be soft and sticky, in which to entrap the grub in its ascent up the tree, as the grub (the female worm) commences its ascent in this locality the latter part of September, and continues until the ground freezes, and again as soon as the frost is out of the ground in the spring, for a term of some sixty days. Care must be taken that the trough or gutter is kept supplied with oil or tar, and kept soft and sticky. If the right material is used, an examination once in two to four weeks is sufficient. The space around the trees inside of the boxes is to be filled with tan bark or sand for a depth of 8 to 10 inches.

The Tree Protector is constructed as follows: A box 20 inches square inside, 12 inches deep, and of boards one inch thick, tongued and grooved at the corners, and nailed together, with top and bottom open,

fig. 278. The oil gutter is a piece 2 by 2½ inches, with a groove one inch by three-quarters of an inch deep, mitred and put together, with paint in the corners and nailed three-quarters of an inch below the top of the box.

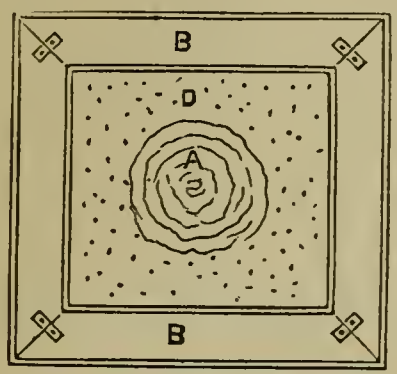


Fig. 278 —*Canker-Worm Protector.*

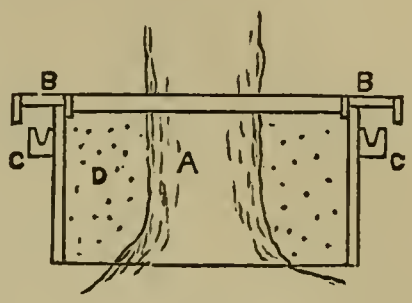


Fig. 279.—*Vertial Section—A, Tree—B B, Cover—C C, Trough—D, Space filled with tan, sand or lime.*

The cover is made four inches wide, and one inch thick, mitred and grooved, with tongue in the corners, the size to be one-quarter inch smaller inside than the box. A band ⅜ by 1¼ inches is put on the inside, to keep the cover in position. Also a band ⅜ by 1½ inches, to be put around the outside to keep the storm from the oil groove. A small piece, ⅜ by 1½ by 4 inches long, is nailed across the joints to stiffen the cover. The cost of the above protectors was $1 each, and they can be made by any carpenter, or at any mill. Some of its advantages are, it allows the growth of the trees for years, without bursting the protector, as is the case with some made from tin. Again, from the first of June until September the box can be raised, the sand, tan or other filling distributed, and the tree washed if desired, and the saving of one crop will pay for protector and labor.

CURCULIO.—The common practice, which, if unremittingly and faithfully followed, will protect the plum crop from the curculio, is to jar down the insects on sheets and kill them. Ellwanger & Barry of Rochester, N. Y., adopt this mode, with the additional care, not commonly observed, of sweeping up daily and destroying all the fallen and infested fruit, the surface of the ground around and under the trees having been made smooth and beaten hard for this purpose. In this way they effect the double object of killing the insects which are at work on the young fruit, and destroying the young larvæ which would sting it the next year; and their trees are always heavily loaded.

CURRANT WORM.—The Agriculturist gives the following as having proved successful, to be used when hellebore cannot be had: Mix five pounds of whale-oil soap with one quart of kerosene, stirring them well together, adding five gallons of boiling water, and stirring again to incorporate them. Then add twenty-five gallons of water, and squirt on the bushes with a syringe, early on a clear day, that the liquid may dry on the leaves. Many persons would not need so large a quantity, in which case the above quantities may be reduced to one-half or one-fourth.

KEROSENE FOR INSECTS.—The Gardener's Monthly recommends the

use of kerosene for syringing mealy bugs, by mixing a small portion of the oil with suds of medium strength. It will readily combine with suds. The quantity of kerosene is not stated, and those who use it will have to try it in various proportions, and observe the results on the plants.

To Exclude Mice from Trees.—1. If before freezing up, embank compactly and smoothly around the stem ten inches high. 2. If the ground is already frozen, make similar mounds of coal ashes, beaten compactly. 3. When both these are omitted, tread compactly the snow about the young trees when it falls. 4. An effectual remedy is to apply a roll of tarred pasteboard or sheathing paper, or a sheet of tin. Sometimes paper has been wrapped around the tree, and gas-tar then applied outside, but this should not be practiced, as the gas-tar soon penetrates the paper and injures the bark of the tree.

Protection from Rabbits.—J. T. Hawes bought sixty shoe boxes, knocked them to pieces, saved the nails, split the boards three inches wide, and made them into square boxes or tubes, nailing three corners, and leaving the fourth to spring around the tree. The shoe boxes cost fifteen cents by the quantity, and each made five tree boxes, and they formed a perfect protection against rabbits, mice, sleety storms and hot sun.

Sheep and Swine in Orchards.—The Report of the Maine Pomological Society states that Washington Gilbert of Bath had found it profitable to feed corn and small grains to sheep and swine in the orchard, both for destroying the codling moth and keeping up the fertility. He thinks the market product of the animals would pay all the expenses; and in this way the culture of the apple be carried on to great profit and on a large scale. Thus managed, he thinks an orchard could be relied on for $100 per acre annually. He had seen apples more than doubled in size by pasturing swine, in a single year. Alfred Smith of Monmouth had seven acres of orchard, which was full of quack grass (or twitch grass), but the sheep and swine pastured in the orchard had entirely destroyed this grass, the sheep eating it very close. He regarded cultivation and manuring as of great importance to orchards in poor soil. He had another orchard where the soil would not yield a quarter of a ton of hay per acre. The trees were feeble, and there were many dead limbs. These were pruned out, the ground plowed and heavily dressed with manure. The trees put on new vigor, and bore abundantly of fine fruit.

Buying Fruit Trees.—We see a recommendation lately published either to send directly to a nursery for the trees, or else through a regular agent, "and to hold him responsible for correctness." How is the purchaser to know whether the trees are correct to name? He may wait several years before they bear; and even then it may require a pomologist to determine difficult questions. Besides how is the judge to know that the fruit came from the trees bought? They may have lost their labels in the course of years, or died out and been replaced by others. A much better way, and to avoid all this difficulty, is to buy of a nurseryman who

has established his reputation, or of his well-accredited agent. The best nurseries keep their agents in one field, where purchasers know them. Intelligent readers of journals and books devoted to these subjects, with corresponding practice, know where to apply and what to do. Others are constantly liable to be imposed on.

WATERING TREES.—As a general rule, watering young trees in summer does more harm than good, by crusting the surface, without reaching the roots; and even if the roots are reached, the relief is only temporary, unless the watering is regularly repeated. There is a great want of appreciation of the amount of water required for trees by those why apply this remedy. A young tree four or five feet high, if growing well, soon throws out roots several feet on each side. If these roots are only three feet long, the circle of roots will be six feet in diameter, and at a depth of one foot there would be no less than twenty-seven cubic feet of earth to saturate with water, requiring for one-fourth the bulk nearly one hogshead for a single watering. It is true that a young tree just set out may have had its roots cut much shorter, but as new ones are to be quickly thrown out into the soil as it commences growth, a narrow watering will do but little good. Clean mellow culture is better than all the watering that can be given—or wide and heavy mulching if cultivation is impracticable.

PRUNING.—There are four grades of pruning—first, the nip of the thumb nail, and if always done in time, no other would be needed. Secondly, with the pocket knife, which must be used on shoots of one year's growth, while yet small, when they prove supernumerary. Thirdly, the removal of small limbs an inch in diameter, the wounds soon healing over and requiring no special protection. And fourthly, last, and not to be resorted to except when trees have been badly neglected, sawing off large limbs, the wounds of which need the protection of paint, grafting wax, or other covering. The first is to be preferred, and can well be used when the owner or gardener can frequently examine young trees; but in its omission, the second is nearly as well; the third will answer; and the fourth is a reluctant necessity.

ACCIDENTAL PRUNING.—An old New-Englander once remarked to us when we advised him to pinch back his blackberry bushes, to keep them within bounds, and make them bear better, "That's so! I can remember when I lived down at Dartmouth, that we always found the most blackberries on bushes that the old cow had browsed down." We lately saw another example in a western paper, where a farmer had set out a hundred apple trees in autumn, and was advised to cut the shoots back, to counterbalance the necessary cutting of the roots in taking them up. But he declined. In the winter a cow broke in and cropped the tops of twenty-five or thirty, and the winter being severe, these and a few others, were the only trees which survived. The others had more top than they could carry, and whipping about in the wind, they did not grow. We would not, however, recommend the cow-pruning for general adoption.

A List of Pears.—F. R. Elliott gives the following list for an orchard of a hundred trees. It is a good list, although every planter would vary more or less from it, and even Mr. Elliott himself, with his wide experience, would doubtless make a different list next time, without this list before him. Variations, however, are not always improvements. The following is the list, which we condense from an article written by him: One Beurre Giffard, 1 Rostiezer, 1 Dearborn's Seedling, 3 Clapp's Favorite, 5 Ananas d'Ete, 10 Bartlett, 20 Beurre d'Anjou, 3 Beurre Bosc, 2 Superfin, 2 Clairgeau, 2 Doyenne du Comice, 12 Duchesse d'Angouleme, 5 Flemish Beauty, 2 Howell, 5 Onondaga, 2 Henkel, 5 Louise Bonne de Jersey, 1 Seckel, 1 White Doyenne, 6 Emile d'Heyst, 3 Winter Nelis, 1 Josephine de Malines, 1 Doctor Reeder, 6 Vicar of Winkfield. Some persons who only wish to have as few kinds as possible for a succession, would select only Rostiezer, Bartlett, Louise Bonne of Jersey, Duchesse d'Angouleme, Beurre Bosc, Beurre d'Anjou, Josephine de Malines.

Cherries for the West.—An Iowa planter wishes to know the best cherries for planting at the West. We would confine the selection to Dukes and Morellos for all that region, and name the Early Richmond, Mayduke, Large Morello, Donna Maria, Belle Magnifique, Pie Cherry or Late Kentish, and Belle de Sceaux. The Heart and Bigarreau cherries mostly fail at the West. The Belle Magnifique does best on Morello stocks.

Early Strawberries.—Purdy's Fruit Recorder describes the mode by which strawberries may be had one or two weeks earlier than in common open ground, which we condense and give briefly as follows: Select ground sloping to the south about one foot in ten. Set early varieties late in summer in the bed about half a foot apart each way. Set up planks edgewise, securing them by stakes, nearly two feet high on the north and west (protection from winds), and half a foot on the south and east. Bank against these with earth. On the approach of winter, cover the plants with evergreen brush, or common brush covered with coarse straw. The winter protection, aspect, and shelter of the plank, hasten the ripening several days.

Wintering Strawberries.—Even when they are quite hardy, some protection during the severity of winter will bring the plants out fresh green and vigorous early in spring, and they will ripen the fruit sooner and bear more abundantly. If the soil is not decidedly rich, a coating of manure between the plants will be an excellent protection; and if much exposed, add a thin covering of rye or other stiff straw, a thin layer of cornstalks, or still better, evergreen boughs or branches. Leave a small portion exposed, and you will be satisfied by the contrast in early spring after the removal of the covering—the one fresh and green, the other brown and feeble.

Succession of Strawberries.—The Boston Cultivator says that city is annually supplied with fine, fresh strawberries for a long time, first from the

South, and finally, in great abundance and excellence from Nova Scotia. We are not informed how long this season of strawberries lasts at Boston; but if the supplies begin to come from Norfolk, and continue in succession from Delaware, New-Jersey, New-England and Nova Scotia, and allowing one day for each twelve miles of latitude, the distance of the two places, 550 miles, would give a difference in ripening of forty-six days, or a month and a half. The difference in the times of the ripening of different varieties, from early to late, or between such early sorts as Nicanor, Jenny Lind and Downer, and the late Jucunda and Kentucky, would give nearly another month to be added to the season. Taking into the account the moderate supplies from places farther south than Norfolk, we might say safely that the strawberry season is made to extend over a season of two and a half months.

TRANSPLANTING RASPBERRIES.—The Rural Home recommends taking up and setting out young raspberry plants when the new shoots have grown two or three inches, when they are to be had at hand, and not from a distant nursery. The process is in substance as follows: Put the ground in good mellow condition; stake rows six feet apart; take up the plants with a light spade, and with adhering soil, placing them in a market basket; set them out, using the hands to draw the earth to the roots, pressing it down firmly. A distance of eighteen inches in the row is recommended. These late planted raspberries are found to make a better growth than those set early in spring. This mode applies more particularly to tip-rooting raspberries, but it may be used for the red kinds—in either case handling with care to prevent injury to the young shoots.

RASPBERRIES AND BLACKBERRIES FROM CUTTINGS.—A. S. Fuller describes his process for raising young plants of raspberries and blackberries from cuttings, a better way than raising raspberries either from rooting tips or from suckers. We give the substance of his directions in condensed form: Dig up the plants to be propagated late in autumn, with all the roots that can be secured. Cut the roots into pieces about two inches long, and place them in alternating layers with sand or fine moss in a box. Place the box in a cool cellar to prevent growth. Keep the sand or moss moderately damp. Early in spring the cuttings will have well developed buds. Plant them out in drills, in rich ground, two inches deep. If well cultivated, they will make good plants by autumn. The caps and purple canes do not propagate so well this way as others, and require some artificial heat.

THE CURRANT.—Dr. Long said at the horticultural meeting at Alton, Ill., that those who eat freely of currants will never need the doctor. He has picked forty bushels of fruit from a fourth of an acre. They want good culture, although often grown in fence corners without care. The ground around the bushes should be kept mellow and free from weeds or grass, and should have every year a dressing of ashes and rotten manure, and whenever attacked by worms, should be dusted with powdered white hellebore.

HONEY LOCUST HEDGES.

DURING A RECENT DRIVE of more than forty miles through one of the best counties of the State, we saw many miles of honey-locust hedge, without a single good, well-formed specimen. It seems almost impossible to impress on farmers the necessity of taking as much care of trees and hedges, as of their corn crops. The former are almost universally neglected; the latter receive all the attention and labor requisite for the best success. The honey locust has the recommendation of great hardiness and large and terrific thorns. But its naturally tall and sparse growth renders necessary a greater amount of attention to give the line of trees a dense and compact form. We sometimes see hedges of this tree worked into the desired shape. But in all the forty miles above mentioned, no example was seen of this character. We trust it may be useful to point out the failures, and show what should be accomplished to make a perfect hedge ot the honey locust.

Fig. 280.

Some of the hedges just mentioned, which had been planted several years, had obviously never received a moment's attention since the day they were set out. And the setting had evidently been carelessly done, as there were large gaps all along the line. Some of the trees were twelve or fifteen feet high, and others only two or three feet. The appearance was like that shown in fig. 280. Others had been well set, but with no subsequent care. These were more uniform, had no gaps, but the trees had not been cut back to thicken the growth, were several feet high, with a rank growth above, and open below, as in fig. 281. A very few had been cut back, and were more dense; but the owners had allowed the space of a foot or more between the cuttings, and they did not present that thick and solid appearance essential to a good hedge. These are shown in cross section in fig. 282. All these are defective and insufficient, and

Fig. 281.

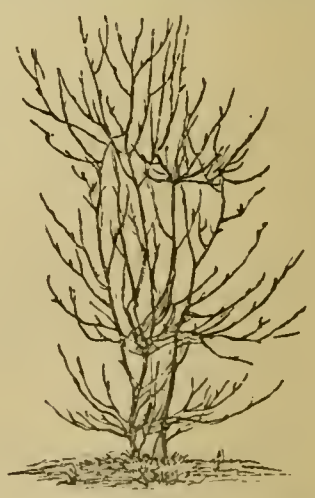


Fig. 282.

cattle and other animals, with some inducement, might break through the best of them.

To make a good hedge of the honey locust, it is essential, in the first place to procure plants with good roots, and if these vary in size, they should be assorted, placing those of equal size together, so that the line may be even, and not with large and small plants mixed together. Secondly, the ground must be well prepared, giving a deep and mellow soil. With care in setting out, there need not be any gaps, and the trees will be uniform in size. Thirdly, the soil, for some feet on each side, must for some years be kept clean and well cultivated, and not allowed to grow up with weeds and grass. The hedge should be as well treated as a row of potatoes and corn, which no farmer would expect to yield a crop in a grass sod. Fourthly, the young trees must be cut back sufficiently to give a broad, dense mass of horizontal shoots at the bottom. This cutting should be done early in spring, and at no other time. If deferred till the buds have swollen, or the leaves have opened, a severe if not fatal check will be given to the hedge.

It is usually best to allow the hedge plants to grow a year or two, to become well established before cutting back; then to cut down in the first place to within three inches of the ground; this will cause numerous shoots below the cut, as in fig. 283. The second year the cut should not be more than 3 or 4 inches higher; the third about 6 inches, and so on increasing the height each successive year until the hedge has reached the desired height. It will require several years to make a good hedge, as in cross section, fig. 284. Many prefer to make longer cuts, or about a foot each year, so as to have a hedge in half the time we have indicated, and in doing so they never get one deserving the name, but merely the skeleton or shadow shown in fig. 282.

Fig. 283.

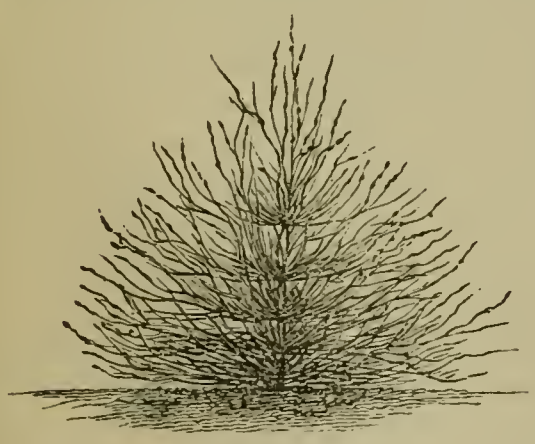


Fig. 284.

Fig 285.

The importance of cutting back in spring before the buds swell, will be well understood by any one who will leave a small portion of his hedge until the leaves have opened. The result will be that the growth, instead of being strong and vigorous, as shown in fig. 284, will be feeble and thin, with only a few small shoots, as in fig. 285.

FLOWERING PLANTS AND GARDENING.

THE DOUBLE ZINNIA.—This is the easiest to procure of all showy lawn flowers. A few seeds sown in the open ground in a circular bed have furnished a profusion of flowers from June to the end of September, and if no severe frost comes, they will undoubtedly continue some weeks longer. The plants grow with vigor, without any care, are about

Fig. 286.—*Double-Flowered Zinnia.*

three feet high, and are covered with a profusion of scarlet, crimson, yellow, orange, purple, maroon and variegated double flowers, making a fine show when seen at a distance. If the plants which bear single flowers are pulled up as soon as they show their character, the double ones have more room, and soon fill the whole space. Those who cannot afford to procure geraniums, verbenas, and other bedding plants, may have the zinnia with almost no care. We sometimes see beds of the zinnia spoiled by growing too thick.

CHEAP PROPAGATING BOX.—A correspondent of the COUNTRY GENTLEMAN describes a small and cheap box for starting cuttings of various kinds, which is so constructed as to preserve a constant supply of moisture, so essential to starting the roots of cuttings. In the annexed figure, (fig. 287, next page,) which is a vertical section of the whole contrivance, *B* is the outside box containing the whole, made of ⅞-inch boards, and is about 10 inches deep, 12 inches wide, and 20 inches long. It may be made larger if desired. A strip of wood an inch square, *C C*, is nailed around the inside half way down. This strip supports a tray, *D D*, having a wire-gauze bottom, for the free passage of moisture. If this wire-gauze is of copper, it will last longer than iron. The tray contains the plants or cuttings. The top is covered with a single pane of glass, *A*, 12 by 20 inches, or more

cheaply, with two panes, each 10 by 12 inches. The water pan *F* furnishes a constant supply of moisture to the plants above, better than could be done by watering. A cast-off box of nearly the right size may be bought

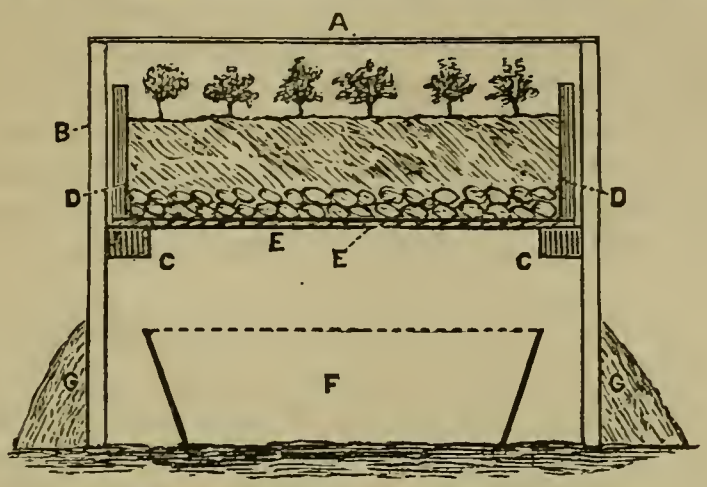


Fig. 286.—*Propagating Box.*

at a shop or grocery. The whole will cost but little. The box is placed upon the ground, and banked outside with earth, *G G*, if the weather is warm, or with manure, if colder.

PLANTING A WILD GARDEN.—We have seen a beautiful grove growing among the rocks of a wild gorge, rendered exceedingly attractive by interspersing the native shrubbery with planted rhododendrons, which were in full bloom when we saw them. Additional charms might be added by investing the rocks and bushes with the trailing forms of the hardy clematis, of the periploca, the climbing honeysuckles, &c.; while the wood lilies, gentians, and other plants which bloom freely in the shade, would give additional attractions. Early in the season masses of the hepatica, sanguinaria, erythronium, and other spring-blooming wild plants, would make such a wild garden exceedingly attractive. Cultivated exotics, such as our common bulbs, snow-drops, squills, hyacinths, &c., might be introduced in open spaces along the borders of the more dense portions of the wild shrubbery. If these were properly introduced, they would lose all the artificial appearance too often given them, and become an essential component part of the wild scenery, and their ornamental effect be thus greatly increased.

For such a garden to give the best effect, it is almost essential that the surface be more or less uneven, and a small ravine, with some rock, would be a valuable addition. A stream of water lined with ferns and water plants would add still farther to its charms. A narrow, curved gravel walk, kept smooth and in perfect finish, would not be discordant with the general effect; it would be the only artificial part of the grounds that could be admitted.

FLOWERS AND MACHINERY.—The London Garden contains a fine engraving of a greenhouse attached to the engine-room at the manufactory of the Waltham Watch Company, near Boston, Mass. The chief engineer, being very fond of flowers, has erected a greenhouse against the engine-

room, and has tastefully filled it partly with flowers in pots, and partly with climbers in larger beds of earth, and these climbers hang in festoons between the engine and the greenhouse. Clusters of grapes ornament the glass roof. The contrast between the ponderous revolving machinery and the delicate tints of the flowers and foliage, is both pleasing and striking. We take it for granted that the necessary heat for the plants comes from the boiler and engine. The surroundings of the building are handsomely planted, and the workmen, instead of being confined to the usual dingy apartments, are constantly in the presence of pleasing objects, which we think on the long run, by acting on the spirits, must increase health and longevity.

Flowers at Railway Stations.—For some years we have seen a fine display of annual flowers at one of the way stations on the Auburn branch of the New-York Central, which have always afforded a subject of pleasing remark to the passengers, and they must have been a constant delight to the occupants of the station house. Another case is mentioned by the London Garden. The walks on both sides of the platform at Lower Norwood Station are fringed with rock borders, and carpeted with saxifrages, sedums, and other low growers, with persistent green leaves, and some bedding plants are added to give brilliancy of color. On one side is a handsome carpet-bed of coleus placed in a flat mass of golden pyrethrum, the whole neatly edged with blue lobelia.

Ornamental Sheets of Water.—In riding through the country, we see many mill ponds and other small sheets of water, which would be exceedingly ornamental and pleasing with a little tree planting on their banks. As they now are, they have only earth margins ; if planted with lines and groups of trees, they would present a fine landscape effect. Among other sheets of water of the character alluded to is one on the margin of a handsome village, which never dries in summer or freezes in winter, being fed by a large spring ; it comprises four or five acres, and would be one of the finest ornaments in that region, if its dull, bare, clay banks had been well planted with elms, weeping willows, black walnuts, maples, &c., all of which would not have cost $10. The same want of taste which results in bleak public streets, prevents the planting of the margins of beautiful streams, cascades and mill ponds, and the owners and visitors not only lose the enjoyment of a wholesome pleasure, but their property is rated much less when offered for sale.

Management of House Plants.—J. A. Varney of South Vassalboro, Maine, gives a good practical article in the Transactions of the Maine Pomological Society, on the management of window plants, some of the leading points of which are the following :

There are three great obstacles, the green fly, red spider, and uneven temperature. To expel the first, place a handful of tobacco stems on a vessel of burning coals, over night, with the room closed—repeated occasionally, it will be the end of them. Or, simpler, cover with a sheet, and

smoke the tobacco under it. The red spider comes when there is too much heat and too little water. Place the pot on its side, and syringe with cold water, washing the underside of the leaves. As for temperature, let it range from 45° to 65°; 40° by night and 50° by day would be better. How different from this is the temperature which the plants generally get! If the plants happen to get frosted, cover the earth with stiff paper, and continue to apply cold water from the well by means of the sprinkler as long as any ice can be seen in the pots. Place them in a room only a little above freezing, and raise the temperature very slowly. The best soil is a mixture of equal parts of rotten pasture turf, cow manure and sand. In selecting plants, touch lightly on high-priced new sorts, and choose old, well tried ones.

Failure of Window Plants.—E. S. Rand of Boston, Mass., says that of the tens of thousands of pot plants sold from the street stands in spring, probably *not one in ten survives*. They are forced into bloom in small pots, have no constitution, and very few ever give another flower. Plants from the warm greenhouse should be *gradually* inured to the cool rooms where they are to remain. Plants taken from the garden in autumn should be carefully potted early in September, hardened in the shade out doors, and removed to the parlor when the nights become frosty, and have plenty of fresh air on warm and sunny days. If taken up late, they are long in blooming. The following sorts are named as best for windows: Of roses few do well, but among these few are sanguinea, the best; agrippina and safrano; nearly all the abutilons; cuphea, a constant bloomer; cyclamen persicum; oxalis, all the species; Chinese primrose; most of the monthly pinks bloom during all the last half of winter; the zonale pelargoniums; the Indian jasmine and calla lily.

Autumn Foliage.—In the village of Union Springs, N. Y., a tree-planting society was formed many years ago, and several hundred trees of sugar and red maple were planted along the different streets. Nearly every autumn these make a gorgeous display of crimson, scarlet, pink and orange, in an almost endless number of shades and different modes of blending. The absence of frost till late in autumn, owing to the proximity of Cayuga Lake, increases the effect. There are two or three trees of surpassing splendor, which maintain this distinction every year. The question arises, will not the time come when these exceptionally beautiful trees will be propagated by nurserymen by grafting, for the purpose of planting on ornamental grounds for display in October? Why would it not be as desirable to give a brilliant termination to the foliage of the season, as to plant for the two or three days of the blooming season in spring?

Tulip Beds.—These are often planted without order or design. By a proper arrangement of the colors, a greatly improved effect is produced. If you have a sufficient supply of bulbs at the present time, properly assorted, you may divide them under the four principal heads of red, purple, white and yellow. The beds should be circular or elliptical. If circular

they are more easily marked out. Set a small stake in the centre, and then begin to plant the bulbs in successive circles, working outward. There should be about three circles of each color, to make them appear in broad, distinct bands. If there are several shades of color in your supply, keep each single circle distinct, and let the different colors blend or pass into each other, arranging them like the shades of the rainbow. If you have beds from which bedding plants are about to be taken within doors, you may set tulip bulbs in these, and have a brilliant display early next season.

PETROLEUM FOR RUSTIC WORK.—It is not unusual to see handsomely executed rustic work going to decay by exposure to the weather. It loses all its beauty, and becomes positively repulsive, as it begins to give out from the rotting of the joints. To prevent this undesirable result, many procure, at much expense, limbs of red cedar for the material, which, being durable, will continue for many years. There is a much better and cheaper way; and soft wood, easily procured and worked, can be rendered as durable as cedar. Soak the whole in crude petroleum, especially at the joints. It may be easily and rapidly applied after the structure is finished, with a common whitewash brush. The wood will absorb it into the pores as dry sand absorbs water. It is a very cheap oil, and a rustic summer house may be soaked with it at a very small expense. The light petroleum will penetrate the wood most; the heavy will give it a rich brown color. A mixture of the two may be best.

FLOWER POTS IN ROOMS.—Pots which contain ornamental plants in rooms, are often needlessly repulsive by the exposure of the earth in which they are planted. We have found a covering of an inch of white sand to prevent crusting the surface or soiling the edges of the pot, and at the same time allow free watering. A more ornamental appearance is effected by procuring from the woods the handsome flakes of fresh green moss, found in damp places or on rotten logs, and covering the earth in the pots neatly with one of these flakes. It serves as a mulch, keeps the earth moist and mellow, admits watering, and furnishes a neat green carpet under the plants.

EVERGREEN SEEDS.—The following numbers were obtained by R. Douglass of Illinois, an extensive and successful raiser of evergreens, after careful weighing:

Norway spruce, ...	58,000 to the pound.	Austrian pine,.....	28,000 to the pound
Hemlock, ...	100,000 do.	Balsam fir, ...	45,000 do.
White pine,.....	20,000 do.	Cembran or Stone pine, ...	2,700 do.
White spruce,...	160,000 do.	Am. Arbor Vitæ,...	320,000 do.
Scotch pine, ...	69,000 do.		

European larch has about 70,000 to the pound, and pear and apple seeds about 12,000.

LICE ON ROSES.—An English writer says that quassia and soft soap will destroy aphides on roses—used by boiling four ounces of quassia chips for half an hour in a gallon of water, and when cold and strained adding two or more gallons of water and six ounces of soft soap. With this syringe

the bushes. The best remedy, however, is tobacco water, made by pouring a gallon of boiling water on four ounces of tobacco, and covering till cold. The shoots may be syringed or dipped in it.

PRESERVING BOUQUETS.—The American Artisan says that bouquets may be kept a month in continuous blooming (of course with a proper selection of continuous bloomers), by first sprinkling with fresh water, and then placing in water containing some soapsuds. Take them out each morning and lay them in fresh water a minute or two, and replace them. Change the soapsuds twice a week.

HARDY SHRUBS.—The following are hardy, of easy culture, and may be obtained from nurseries at moderate prices: Tartarian Honeysuckle, Purple Fringe, Japan Quince, Philadelphus, Siberian Lilac, Snowball, Purple-leaved Barberry, Button Spiræa, Snowberry, Weigela, Double-flowering Almond, Silver Bell, Dwarf Horsechestnut, Deutzia and Bour-salt Rose.

ANNUAL FLOWERS FOR WINTER.—Vick, in his Floral Guide, mentions the following cheap and easily raised annuals, for blooming in winter in pots, and which may be easily obtained by any one who may not be able to procure costly or rare greenhouse plants: Mignonnette, balsam, *Cobea scandens*, sweet alyssum, stocks, &c.; and any plants growing in the garden which have not bloomed, may be taken up and potted for winter.

THE SPIRÆAS IN WINTER.—A correspondent of the Prairie Farmer says that the small double white and Reevesii, if grown during summer in open ground, may be taken up in autumn in large pots, and placed in a cold pit covered with glass. Early in March a profuse bloom will appear, very desirable for bouquets and wreaths.

IMPROVED MODE OF SHOEING HORSES.

A MODE of keeping the shoes of horses sharp, attended with little expense, and available at a minute's notice on any slippery emergency, without going to the blacksmith, is described in the London Agricultural Gazette. It was adopted by the Duke of Westminster for all his horses. On one occasion, when, after a mixed fall of snow and rain, the roads became coated with ice, the carriage horses traveled long distances over a hilly country, without the least inconvenience, and without losing a single one of the steel points or studs on the way. It is the invention of G. Fleming, Veterinary Surgeon of the Royal Engineers. The following is the description:

The stud is a simple bit of steel, of any convenient length—about an inch is found to be very serviceable—square, pointed at one end, and slightly tapering from about the middle to the other—that which enters

the shoe. No filing or finish is necessary—*A*, fig. 287. The draught horses have a stud at the toe of each shoe, as well as one at each heel; but we find that, when a little snow is on the ground, a secure foothold is maintained with only one stud in each shoe.

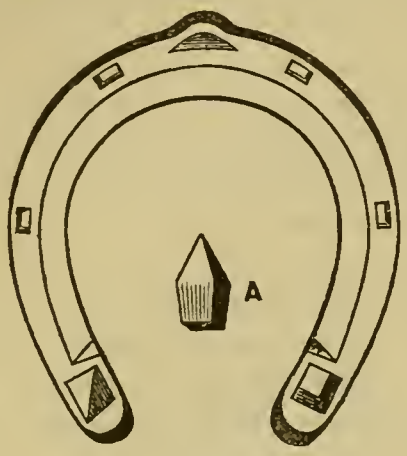


Fig. 287.

Two things have to be attended to in this matter: 1. The stud must fit tightly in the hole, without "wobbling" in any way. 2. It must not pass quite through the shoe, or the hoof will push it out.

To fix the stud in the shoe, it should be driven into the hole by one or two smart smart taps on the point.

The method, in addition to its simplicity and great efficiency, is wonderfully cheap. An old horse-rasp, value threepence, will, when drawn out as a square rod of steel, suffice to make eighty-two studs, which one of my troop farriers can knock off in an hour. A set of these will last for a number of days.

When required to be taken out, a few taps on each side are sufficient for the purpose.

The hole in the shoe, slightly tapering, is made with an ordinary square punch, and the farrier's eye alone gauges the size of the studs, every one of which is made at one heat.

Every shoe put on our troop horses at the end of October and commencement of November had the holes punched in it; and, as a large number of studs were lying in readiness, when the frost set in, the horses were rendered proof against slipping in a few minutes, without going near the forge. This saved a great amount of expense and time, as well as labor, to the farriers, in addition to preventing damaged hoofs and much lameness.

About five per cent. of the studs fell out, but as they are so cheap, this is of no moment; and one stud per shoe affords a good foothold. On long marches a few spare studs were carried. The studs never break in the shoes.

To prevent losing any of the studs, a little practice would be sufficient, in giving the right taper to the studs and sockets, so that they would be firmly held by friction, in the same way that a nail is held in wood.

FREQUENT SHOEING BEST.—Farmers are apt to insist on having their horses' shoes "put on to stay," making this point the only one insisted upon. The rapid growth of the hoof soon renders the best shoe unfitted for the foot. Shoes for farm horses should be so put on that they will stay tight, or nearly so, for five or six weeks, and then be taken off and re-fitted. It causes the expense of "setting" some five or six times more during the year, but saves many a lameness, besides keeping the feet always sound.

SUGGESTIONS IN RURAL ECONOMY.

BOB-SLED FOR LOGGING.—D. B. RAYMOND furnishes the COUNTRY GENTLEMAN with a detailed account of a sled which he has used for years in drawing logs out of the woods, and which will turn short corners, and with which a team will start a load and draw one-fourth more than with any other sled. We have not space to give all the details of construction, but merely to point out the leading peculiarities, which will enable those familiar with coarse timber-bobs to construct one.

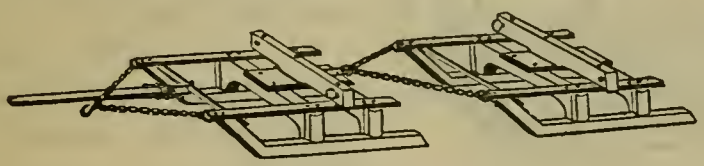


Fig. 288.—*Chain Bob-Sleds.*

The tongue is not set stiff, but is fastened to the nose-piece with two clevises—one on the tongue, and one on the cross-piece, making a sort of universal joint, permitting it to turn at right angles, and allowing the team to turn half around without moving the load, and to clear trees and logs. The draft-chain being entirely independent of the tongue, the latter may be made light. If used much on the road, it should be heavier, and set stiff.

The bobs are coupled together with a forked cable chain in place of a reach, with a grab-hook on each end, and a ring in the centre. This ring is put into a clevis at the rear end of the saddle-plank of the front bob, the other ends of the chain to rings on the nose of the rear bob. The rings are large enough for the chain to double through, so as to let them out or draw them together, and by which logs of any length from 8 to 25 feet may be placed equally on both. The rings, properly put on, cannot catch a tree or brush; and the chains playing up and down, permit the rear bob to go over the roughest ground, logs or brush.

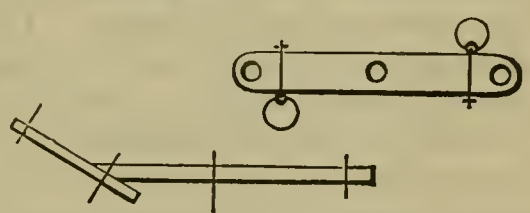


Fig. 289.—*Sled Shoe and Bolster.*

The shoes of the runners are made of the hardest dry wood, sawed slightly across the grain, so as to wear with it. They will last a whole winter. The lower figure in fig. 289 shows how they are put on. The bolster of the rear bob is 4 by 5 inches. The bolt heads which fasten it should be "let in," so as to be out of the way. The bolster of the forward bob is shown in the upper figure of fig. 289, and has rings to bind the load. The saddle-plank, on the front bob, should be 2½ inches thick and a foot wide, to support the king-bolt and whole load.

HAY RACK.—L. D. SNOOK describes the following convenient form in the COUNTRY GENTLEMAN: There are many forms of hay and grain

riggings, but as far as my experience and observation extend, the one shown in the accompanying illustration (fig. 290) possesses more desirable qualities than any other: *T T* are bed-pieces of pine or other straight-grained light wood, 14 or 16 feet in length, 8 inches wide and 3 inches thick; if of oak or other hard wood, 2½ inches thick will give sufficient strength. Four cross-pieces, *B*, of hard wood, 1¼ inches thick and 6 inches wide, are morticed and firmly secured to the bed-pieces. This constitutes the frame or foundation, and is shown in fig. 291. It is frequently used separately, to haul rails, boards, stones, manure, &c., and is a convenient, strong and handy arrangement for the purpose. In fig. 280 is shown the rigging complete, of which its four cross-pieces or arms, *P*, are 7½ feet in length, 5 inches wide and 2½ inches thick.

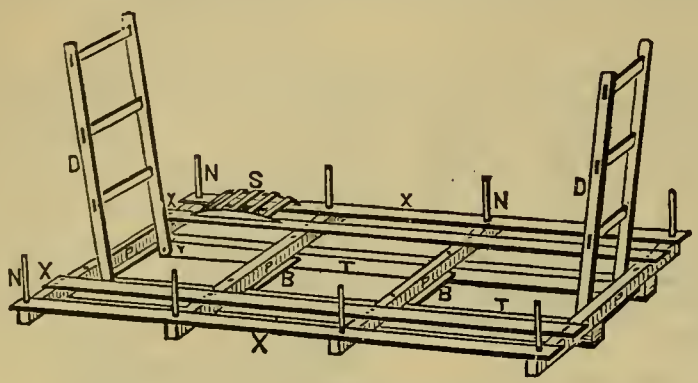


Fig. 290.—*Combination Hay Rack.*

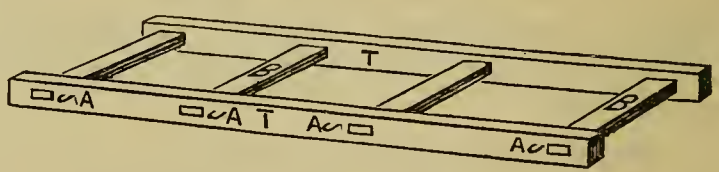


Fig. 291.—*Frame or Bed-pieces.*

If designed for a "sectional rigging," and to prevent side movement, a half-inch groove is cut into the lower sides of the cross arms, *P*, so that they fit closely upon the bed-pieces. To prevent a forward or backward movement, eight strong iron hooks are attached by staples to the sides of the cross-arms, and when placed upon the bed-pieces are readily hooked into the staples, *A*. Thus arranged, one man can easily place the rigging upon or take it from the wagon. Or, if desired, bolts may be used to fasten all together, by passing them through the cross arms and bed-pieces; there is not 25 cents difference in the expense.

Standards, *D*, can be either stationary, or hinged so as to be quickly lowered, raised or removed, by a small bolt, as shown at *Y*. The standards should be 6½ feet high, and quite strong, to withstand the pressure of the load, as well as to serve as a ladder. The boards *X* should be of of the same length as the bed-pieces, and one inch thick and six inches wide, of straight-grained light wood. Wooden pins or stakes, *N*, are inserted as shown, and should be only slightly sharpened. Should the hind wheels project above the boards *X*, bridge over them, as shown at *S*. Wash with petroleum, and keep under shelter when not in use.

LEVEL FOR UNDERDRAINING.—Take a board of clear pine, 16½ feet long, taper it as shown in the cut (fig. 292), attach a leg at each end for its support, of exactly equal length, and a spirit level on the top. This level may be proved by placing it on a floor, and blocking it up until the bubble

stands level; if when reversed or turned end for end, it stands at the same point, it is correct. In using it, begin at the lower end of the proposed

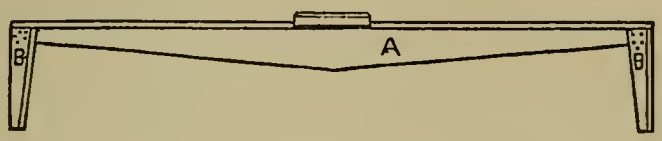


Fig. 292.

ditch, and place a small board a few inches square under each leg. Then with a wedge raise the lower end till an assistant at the middle finds it to be level. Measure the height the leg has been raised, and that will be the descent for a rod. Keep a record of every rod, and add them all together, and that will be the whole fall. If the land is uneven and drops in some places, subtract the sum of these descents from the other sum. If the level is inconveniently long, one may be made 8¼ feet long, or half a rod.

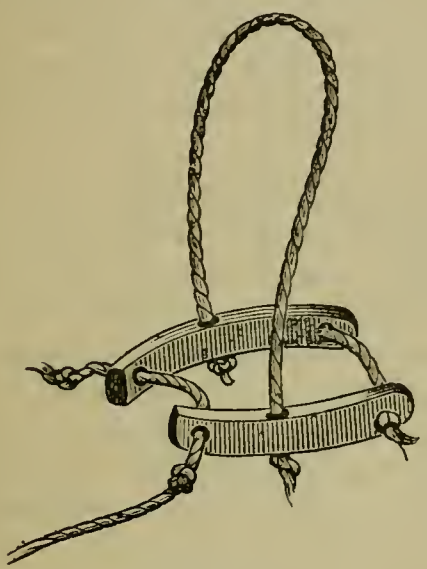


Fig. 293.

HALTER FOR ORCHARDS.—Col. Weld describes, in the COUNTRY GENTLEMAN, a halter used in the island of Jersey for cattle running in orchards, as it prevents them from raising their heads more than a few feet from the ground. It is shown in the accompanying cut, (fig. 293,) the wood pieces enclosing the cheek bones, and the loose rope running under or behind the fore legs. It might be occasionally used in this country.

MINER'S SUBSOIL PLOW.—This implement combines lightness and strength in an unusual degree. The cut (fig. 294) shows its peculiar form, the acute point penetrating the earth easily, and the long wedge loosening up the soil with comparatively little draught. With a one-horse plow (weighing 35 pounds) and a single horse attached, we found no difficulty in running down nine inches into a compact clay soil. It is made by R. H. Allen & Co. of New-York.

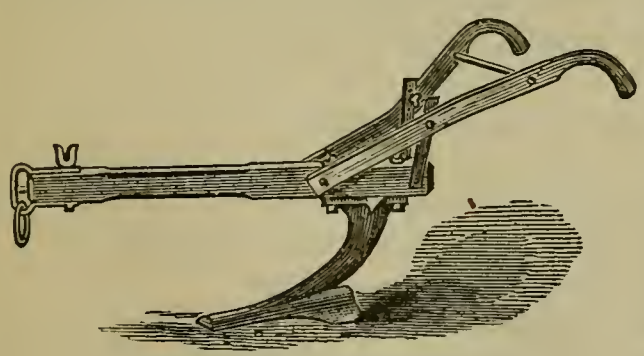


Fig. 294.

A CONVENIENT TOOL.—Mr. L. D. SNOOK sends the description of a convenient stable tool to the COUNTRY GENTLEMAN, and urges its use as enabling the farmer to do the same work in considerably less time than without it. His description is as follows: The combined stable rake and

scraper is shown in fig. 295. The head *B* is made of hard wood, 14 inches in length, 4 inches wide, and 1½ inches thick, at one side tapering to ¼ inch in thickness. Six or seven ¾-inch holes, 2 inches in depth, are made upon the wide side, in in which are inserted sharpened hardwood pins *A*, projecting 3½ inches. The handle *E* is 4½ feet in length, and braced as shown. With the upper or sharpened-pin edge the best and unsoiled bedding can be hauled up in the stall, or it may be used for pushing out the refuse straw and manure that is quite difficult to handle with the smooth edge of the tool, which it is necessary to use for scraping out the finer parts.

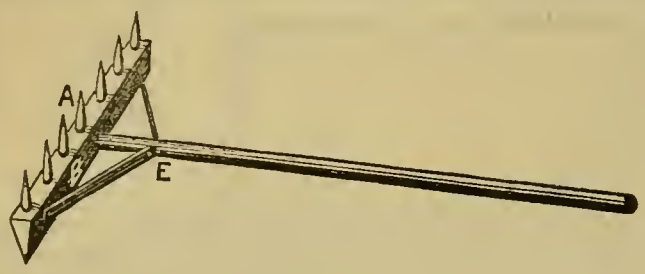


Fig. 295.

REMOVING BOULDERS.—I notice an inquiry for the best way to remove boulders. I have had some experience with them, and have resorted to various means to get them off from my fields. I have broken them with fire; I have dug them out and drawn them off with three teams; I have buried a great many, and on one occasion came near being buried myself. But latterly I have employed men to break them with powder, which I think the cheapest and best way to get rid of stones too large to be drawn with one team. I took over one hundred of these troublesome pests from my cornfield last spring one of which cost $6.25 to get broken into pieces of suitable size to be drawn with one team. This monster made thirty-five large boat loads of fragments, many of which were very fine face stones for wall. The expense for breaking stones which will make three or four boat loads, with me, has been 37½ cents. Where land is worth clearing of boulders, the stones are valuable for fencing and should not be buried. If land is so occupied with stones that it will more than fence the land, it will not pay to remove them.—W. F. BAGGERLY, in COUNTRY GENTLEMAN.

RULES FOR FARMERS.—1. Select good land, and reject sterile, no matter how cheap.

2. Raise no weeds, but only profitable crops.
3. Underdrain, wherever needed.
4. Adopt a good rotation of crops and adhere to it.
5. Provide sufficient shelter for domestic animals.
6. Keep everything connected with domestic animals neat and clean.
7. Plow well, cultivate well, do all work well, and not slipshod.
8. Accumulate and save manure, and apply it properly.
9. Procure good implements, and take care of them.
10. Raise good animals and take care of them.

The preceding ten rules will be of much use if carried out, and we add two more, to cover them all, viz.:

11. By weighing and measuring, and with careful accounts, ascertain just what every crop or every animal costs you, and find out by this mode the market value of each.

12. Employ then those crops and animals which you find give you a good profit, and drop all else.

You can thus have the satisfaction of knowing that you are carrying out Ricardo's two famous rules for acquiring wealth, namely: 1. Cut short your losses. 2. Let your profits run on.

MEASURING HAY.—The weight of hay cannot be determined with accuracy by measuring; but some experience or a few trials will enable the owner to ascertain approximately without great deviation. Fine, flexible hay will pack closer than coarse, stiff hay; and that which is cut early will become more solid than dry, stiff, late-cut hay. The degree of dryness when the hay is drawn in, also affects the result. The compactness will, of course, vary with the height of the mow or stack. As a general average, however, under a pressure of ten feet or more, and with a medium degree of the other influences we have mentioned, about five hundred cubic feet of timothy will weigh a ton. Six or seven hundred, or even more sometimes, are required for clear clover.

OATS BY WEIGHT.—A French chemist analyzed a number of samples of oats to determine whether those of light weight are of equal value, pound for pound, with those that weigh heavier in proportion to measure. The result showed that the composition of light and heavy oats, when taken in bulk, is almost identical. A French postal contractor tried a similar experiment. Selecting out of 300 horses two teams of twelve each, in all respects alike, and treated alike, one team was fed for six months on oats, weighing 77 lbs. per hectolitre; and the other, for the same time, on oats weighing 117 lbs. per hectolitre. At the end of the period no difference could be detected in the two teams, the horses being all in excellent condition, and good working order. The oats were fed *by weight and not by measure;* and the conclusion is therefore that weight, and not measure, should be the standard by which they are bought and sold.

HEN MANURE.—Several estimates and experiments make the value of dry hen manure, in gardening, about $50 per ton; each fowl on an average consumes about one bushel and three-fourths of corn annually, or a little less than a gill and a half a day; and it has been found that one hen will yield about a bushel to a bushel and a third of manure per year. Various estimates make this worth from seventy cents to a dollar for each animal. It is very easy to save it, by placing the scrapings or cleanings of the hen-house in a barrel with thin alternating layers of road dust.

CUT-WORMS.—J. B. Root says that if balls of freshly cut clover are scattered through the garden or field, the cut-worms will be attracted to them, and can then be easily destroyed. We recommend, by way of preference, killing them at once, whenever their marks can be seen, without waiting for clover balls.

NOXIOUS WEEDS, AND HOW TO KILL THEM.

A DISCOURSE ON WEEDS is always in season from early spring till December, because they are always growing or scattering their seeds in some way during this long period. And the subject will not be exhausted, and hints will not become needless, while their annual cost to the Union is five hundred million dollars, or one-fifth the value of all the agricultural products of the country. This is not an extravagant estimate, for in many places the weeds eat out half the crops, and make the cultivation of what remains at least double the cost of clean management.

On looking back many years, we see the progress which has been made in the mode of attacking them, in successive gradations. Half a century ago the common injunction was to "pull up and remove carefully those which had gone to seed, to prevent the seeding of next year's crop" —to "be careful not to scatter the seed," which had been already borne in abundance—fig. 296. This was regarded as good and careful management. But an improvement was made on this mode, namely, by not allowing the seed to ripen—their formation was to be *prevented*—and, excellent idea as it seemed to be, under this improved treatment weeds were destroyed when half a foot high, more or less. But observing cultivators were not satisfied. They discovered that the labor of rooting out these full-grown or half-grown monsters was too great. They struck boldly, therefore for the destruction of these intruders while they were only an inch high. The labor was decreased incredibly. There was a great difference in the force required to crush a delicate little organization as large as a cambric needle, and one a foot high, with roots like strong horns branching and penetrating the soil another foot, and lifting the plants of the crop when torn out. The improved mode lessened the labor ten, twenty or thirty fold. The great point then was to take the weeds in time, and it was found to be better to pay a man five dollars a day to destroy them in their feeble and delicate condition, than at fifty cents a day when stout and shading the whole crop.

Fig. 296.—*Pig-Weed.*

But a still farther improvement was made, and this was to destroy the weeds before they came up, when they were just beginning to send out their minute white fibres from the seeds. In other words, the steel rake, fine harrow or cultivator, is passed over the surface while it is yet perfectly clean. The process consists in simply mellowing thoroughly the whole surface without waiting for any of them to make an incipient appearance.

Any one may easily estimate the comparative difference in cost between these four modes. Wait till the weeds ripen their seeds, and then carefully pull them up and place them in a heap ; pull them up, or hoe, or plow them, when a foot high; or destroy them when a single stroke of the rake or sweep of the harrow kills them by hundreds at a single movement ; the last mode exceeds in economy the first at least fifty or a hundred fold.

It is well worth while to contrast *finger weeding* with the wholesale destruction by means of the two-horse harrow. The contrast may be less striking in the garden bed, where finger work is performed side by side with the hand rake or the sharp hoe ; but on a larger scale—on the broad acres of the farm—the difference is enormous. The truth is, no good farmer should ever use a hoe—or very rarely. The summer fallow for eradicating all foul stuff, where this has obtained possession, is not sufficiently appreciated. What are termed *hoed crops* are too costly when cleaned by hand. The single horse cultivator is quite slow enough in in its work. Some crops are made quite clean, when small, in a rapid manner, by means of the smoothing harrow, which sweeps over the whole surface ; and all others, that is when the land is not already clean or cannot be treated with this harrow to render it so, should be occupied with broadcast crops.

Fig. 297.—*Purslane.*

Fig. 298.—*Canada Thistle.*

Fig. 299.—*Quack Grass.*

These remarks apply mostly to annual or biennial weeds, such as ragweed, fox-tail, red root, pig-weed or purslane (fig. 297.) To clear foul land, it is necessary to plow and harrow many times, to bring up successively the seeds which lie at different depths, and which will not germinate till brought to the air. But perennial-root weeds, as Canada thistle (fig. 298), milk-weeds, quack-grass (fig. 299), &c., which spread mostly by the roots,

may be thoroughly eradicated in a single season, and at little expense, by plowing often enough to keep the leaves perpetually under. While Canada thistles and quack-grass have been easily rooted out thus in four or five months, the work being thoroughly done, it would never be accomplished if occasional cessation were permitted, so that the plants could get a little breathing spell above the surface, and the labor might continue a hundred years or more.

To recapitulate then: For annual weeds, kill them in earliest infancy, while minute and fragile, and easily swept off by myriads; and for perennials, never let a solitary leaf appear above the surface, and the work will be speedily and cheaply accomplished.

ORNAMENTS FOR PLEASURE GROUNDS.

CHEAP RUSTIC FOUNTAINS.—The following description is given by G. MURCH in the COUNTRY GENTLEMAN:

A (fig. 300) is the fountain basin or pond; *B*, a barrel to contain the water; *C*, an iron or lead pipe, or pump logs, conveying water from the cistern to the jet; *D*, a jet or rose. The barrel may be hidden behind a fence or wall, a tree or clump of shrubs, or wall of rock (fig. 301), as circumstances, nature of ground or taste may determine. If rock-work is used, a cave or grotto might be built—not a bad place in which to read the COUNTRY GENTLEMAN for an hour on a sultry day. The pockets or holes between the rocks may be filled with soil and planted with ferns, rock plants or annuals. If the fountain is on the lawn, the grass might be carried to the edge of the basin; if on gravel, the gravel should reach to the basin; if on a terrace, the basin might be edged with dressed stone, or edging tiles, but a rustic fountain is best edged with rock-work. A border for flowers might surround it, but in that case one or more open spaces should be left to allow people to walk to the edge, to view the goldfish, &c. Several different jets should be used for variety, not omitting the revolving jet.

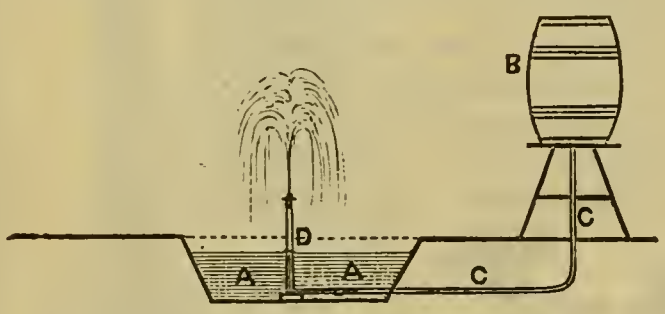


Fig. 300.—*Cheap Fountain.*

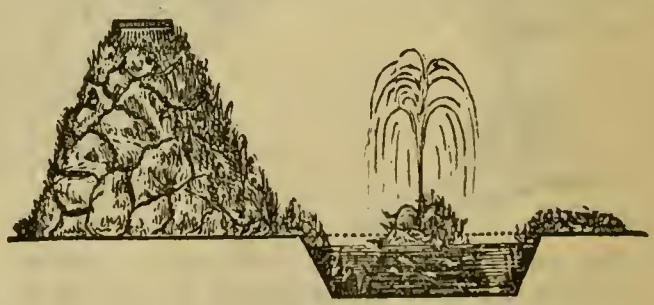


Fig. 301.—*Fountain Finished.*

With a little taste a fountain might be a permanent object of beauty. In many places there are spots (and often not far from the house) where a fountain, a cave or a cascade might easily be formed. There is often a dell or gully, a little ravine, or even a quarry-like hole, an eye-sore to the place, yet there is perhaps a small stream running through it, or a spring or stream near from which the surplus water could easily be carried through a ditch or pump-logs to the head of the gully. Then from pond or dam lay pump-logs or pipes from thence to the centre, or the most suitable place for the fountain.

SUMMER HOUSES.—These add to the attractiveness of ornamental grounds in secluded spots. A seat where girls can sew or read in the fresh open air, will more than pay for itself by the health it will preserve or impart. Farmers of moderate means may enjoy them. We built one for $15 according to the following design; any carpenter can do the work:

First, procure eight round posts about seven inches in diameter, which may be of red or white cedar. Other straight, smooth timber will answer.

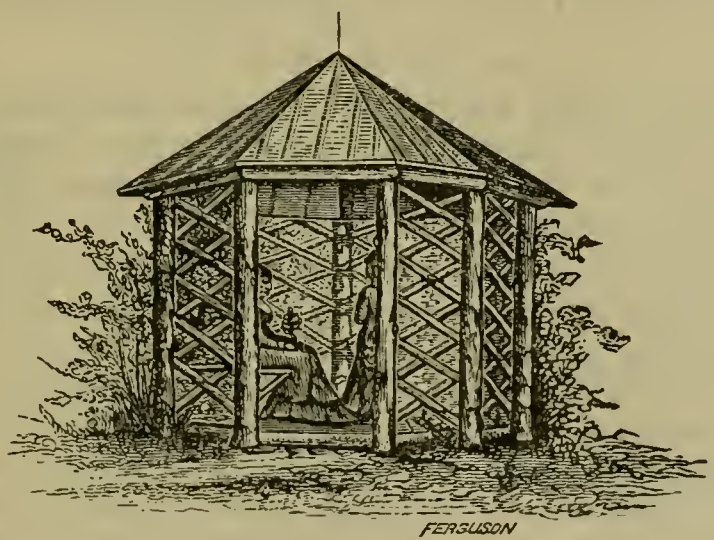


Fig. 302.

Drive a stake or peg into the centre of the spot where it is to stand, and by means of a cord attached to it, and with a sharp stick tied at the other end, proceed to scratch a circle on the ground. The circle will be of the same diameter as the summer-house; about eight feet is a convenient size; but if for only a few persons, six feet may do. Divide the circle into eight equal parts by a measuring stick of the right length. Set a post at each end of these parts—about 1½ feet in depth—or even a foot, if the posts are made stiff by pounding the earth compactly about them as it is thrown in. Then with a level mark the top of each post, so that all may be sawed off at the same height (about seven feet), and on these flat ends nail pieces of boards to form the plates. Other pieces set under these on edge, 3 or 4 inches wide, will stiffen them. The octagonal roof is then placed on these plates, made of inch boards, and battened at the joints, as shown in fig. 302. If a floor is intended, it is next laid on small joists. If no floor is laid, clean

gravel will make a good floor. Next, brackets are attached to the inner side of the eight posts, and an octagonal seat made of seven pieces of boards, extending around the whole except the entrance, is placed upon them. Seven strips of ½-inch board, a few inches wide, nailed from post to post, form the back of the seat. It is now finished, ready for the coat of crude petroleum, which it should next receive, and which will give it a rich brown color, and render it as durable as cedar. The petroleum should be copiously applied, which may be done with a common whitewash brush, and two gallons are enough to do the work thoroughly. Rough boards are used for all except the floor and seat, and if the posts have the bark on (which will adhere if cut when not growing), they will present a more ornamental rustic appearance. Common strips of lath form the lattice work, and are nailed between all the posts, with the exception of one space left for entrance.

SUGGESTIONS IN HOUSEKEEPING.

THE FOLLOWING ARTICLE, written for the ILLUSTRATED ANNUAL REGISTER, is from the pen of a skillful young housekeeper, who gives the result of her own experience, and it may furnish valuable hints to other young housekeepers :

Old newspapers are useful in many ways. Under carpets they save wear and keep the floor warmer by covering cracks. Over the edge of each step, under stair carpets, they are almost indispensable, and serve a better purpose than clumsy carpet pads. A newspaper folded across the chest and buttoned under the outer garments, protects the lungs in a long, cold ride. Newspapers are equal to chamois skin for rubbing windows after they are washed and wiped. Zinc under stoves is better polished by rubbing with dry paper than by washing. Dampened paper is good to rub up and brighten the kitchen stove.

Whiting and water cleans white paint and window glass nicely.

Kerosene oil applied with a feather to every crack and corner of a bedstead will expel bed-bugs.

Kerosene rubbed frequently into unvarnished furniture, beautifies it very much.

A piano or other handsome piece of furniture, sometimes becomes dull in appearance. The following means will produce a high lustre: Wash the article in nearly cold water, with a very clean, soft rag, and wipe it dry. Next rub it all over with sweet oil, and leave it to stand an hour or more. Then rub off all the oil with a towel—rubbing till no more oil comes off upon the cloth—and the furniture will shine like new. This is only to be used on varnished articles.

Dining tables, if varnished with furniture varnish, are easily spotted with

white by hot dishes. But if *coach* varnish is applied, such as is used on carriages, the table will always remain bright and uninjured.

If you use a carpet-sweeper, you will find it takes up the dust better if you press upon the handle while working it. A sweeper does not raise dust like a broom, and is therefore good among nice furniture, embroidery, &c. Much strength should not be used in sweeping with a broom, it wears out the carpet; but short, light strokes, plenty of light, and observant eyes, are requisite to get the floor everywhere clean.

Powdered alum is a safeguard against moths, when applied to every crack in the floor and around the edges, and under the baseboard, under a carpet. It is also considered a security against the carpet bug. Some ladies powder the whole floor with it before putting down a carpet.

A very good fly-trap is made by filling a teacup nearly full with suds, and covering with thick paper smeared on the under side with molasses, fig. 303. Cut a hole large enough for the flies to crawl in easily. They are best caught in a rather dark place.

Save bits of oilcloth for lamp mats. An old pie-tin makes a good tray on which to set lamps through the day, as the kerosene is apt to leak over and spoil shelves. Glass lamps with a ledge around the top of the reservoir never run over, and are always clean to the touch.

Fig 303.—*Fly-Trap.*

If a light is needed through the night, a taper is preferable to a lamp, avoiding smoke, gas and too much light. A box of tapers can be cheaply purchased; but they can be made at home in the following manner: Cut a circle of soft paper, about two inches in diameter, fold it so that you can get hold of the central part of it, twist up a point of it in the centre, so that the point will be sharp, and about half an inch long; tie it closely at the base of the twist with a thread, and spread out the untwisted part of the circle at right angles with the twisted point. This is the taper, and the point is to take the place of a wick and draw up the grease to burn. When used, set it on a thin piece of cork in a saucer of lard, and light the tip of the point—fig. 304.

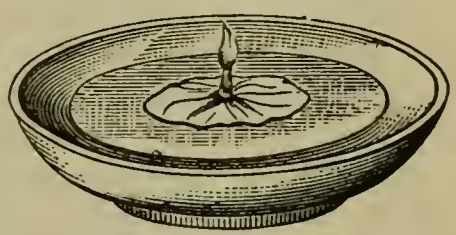


Fig. 304.—*Taper.*

A window mop on a long pole is a convenience for washing the outside of windows. Perhaps an ingenious person might contrive a home-made article which would cost nothing. They are sold for a dollar and a half, but will last long and save much time and much effort in reaching.

Clean sinks with a whisk broom, and scald them daily. A clean tooth-brush is good to scrub the metal strainer of a coffee-pot. Cut a potato in two, and use the cut end to dip in bath brick for scouring knives—the juice of the potato helps to cleanse. Keep whiting near at hand when you wash your silver, and scour off any little spot at once. Clean silver often.

It is much easier to keep it bright than to make it bright after long neglect. There are many nostrums sold for scouring silver which leave it permanently tarnished a little while after using. Good housekeepers say the best thing for silverware is "elbow grease."

Diluted carbolic acid is good to pour down drains and sprinkle about cellars; so is diluted bromo-chloralum. It is best applied with an "atomizer" or sprinkler of some kind. I once sprinkled a sick chamber with it by hand, undiluted, and it left little sticky, black spots on the carpet for a long while.

If your stairs are varnished, wash them with clear warm water. Soap makes varnish look dull.

Wash toilet brushes in warm water (without soap) and a few drops of spirits of ammonia. Dry them in the sun. The ammonia cleanses quickly and thoroughly, and the bristles will not lose their stiffness.

Careless painters sometimes drop paint on window glass. A house-cleaner told me that benzine, applied to the spots and left on them a little while, will remove them when washed off.

In a cold climate waterpipes in the second story of a house are very liable to freeze. A small stream of water should be permitted to run night and day, during severe weather, to prevent this. If the pump handle is not put up at night, and water freezes in the pump, thaw it out patiently with cold water. Domestics hurriedly dash in hot water, the ice gives way, but the leather is injured, and they have the pleasure of "priming" the pump every time it is used thereafter.

If you don't want to break glass goblets, preserve dishes, &c., when you wash them, lay them *sidewise* in the hot water, and turn them over a few times; they will not break, even in boiling water, because all the parts will be expanded equally and at once. To break them it is only necessary to stand them up in the dish-pan and pour on hot water.

When canning fruit, the glass cans should always be partly filled with cool water, set in a pan of cool water on the stove, and heated gradually till the moment you wish to put in the fruit—the hot preserves will not crack hot jars.

Some people have a contempt for calico. They are generally of the careless and slatternly sort. A woman who knows how to do up calico nicely will appreciate the clean, neat dress, however cheap. If a calico dress is washed carelessly, starched stiffly, sunned a day or two, and half ironed, it is not a very comely sight. But if quickly dried in the shade, very thinly and evenly starched and ironed on the *wrong side*, so that it will not shine, it will look like a new dress for a long time. Many pretty blue prints and cambrics fade when washed in the usual way. If they are washed the first time in strong salt and water, or water to which a little beef's gall is added, the color will be set so that they will always be as handsome as at first, and can be washed ever after like other colored goods.

Scald out all fruit stains, before washing, with boiling water.

Ink stains, while fresh, can be removed from white articles by soaking in milk. If ink is upset on a woolen table cover, take it up quickly with blotting paper, and it will never show.

A superior laundress tells me that obstinate spots in soiled clothes are removed by wetting them with a strong solution of borax, and exposing to the sun awhile before washing.

Complaint is often made that wringers tear off buttons. When you wring your clothes draw them through so that the buttons lie flat while passing through the rollers, so that there will be no strain upon them.

A folded sheet is better than a blanket to spread over a mattress and under the sheets; being more easily washed, it can be frequently changed. Cotton pillows are preferable to feather pillows, being cooler to the head. You can make a pretty and durable "comfortable" of white paper muslin, knotted with scarlet or blue yarn or worsted. Cradles should have a large wire hoop fastened near the head, to hold up a cover to protect the child's head from currents of air, and for hanging a mosquito net during fly-time. A large box, the shape and size of a lounge, cushioned on the top and covered with chintz, with the cover on hinges, to be opened at pleasure, makes a convenient stowing-place and cheap couch. If wished, the interior can be fitted with shelves and tills.

A piece of an old Turkish towel makes a good duster. Turkish towels also make nice wash-cloths cut into proper shape and neatly fringed.

Bright-colored, striped wash goods, or white muslin bordered with a row of pressed autumn leaves, make very pretty, cheap lambrequins for bedroom windows.

Pretty rugs are made very cheaply of coarse sacking, such as is used for packing. Cut it of the right shape, fringe out the edges, and work a border in cross-stitch at a little distance from the edge—fig. 305. Germantown wool, which is much cheaper than zephyr, is suitable for this. A monogram in the centre has a good effect.

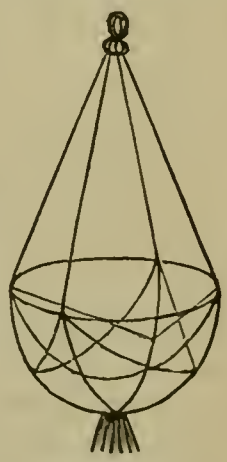


Fig. 306.

To make a very beautiful hanging basket, tear coarse bleached muslin into strips, ravel down the strips till only two or three threads of warp are left, so that the strips are nearly all fringe, and loop them over a wire foundation, (fig. 306,) with a large tassel at the bottom, and cords to suspend all of the fringed material. Even half an egg-shell, with a crotcheted open-work cover, makes a nice little hanging basket, in which you can raise a few grains of wheat, or a tiny plant

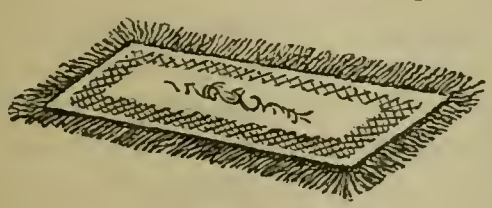


Fig. 305.

Save old stockings and worn "gauze" underclothing. They make strong, elastic patches for other garments of the same kind, and for cotton

flannels. When cloth is stretched by tearing across a breadth, the edge may be straightened by creasing it down in narrow folds with the fingers, a little at a time, beginning in the direction opposite to that from which it was torn.

Nervousness and restlessness in warm nights may be often prevented by a cold bath in a large tub, or better still, in one of the hat-shaped bath tubs which ought to be in every country house—which are light and portable, and afford a refreshing bath with very little water. Feverishness is much allayed in sickness by washing the patient all over in water containing a little soda dissolved in it.

The heads of infants are sometimes injured by the remorseless use of the fine-toothed comb. A little sweet oil applied to a young infant's head, and washed off carefully is useful. For an older child, rub on raw yelk of egg before gently combing.

Creeping babies are spared many bad colds in winter, if their limbs are protected with cotton flannel drawers reaching to the knee. The drawers should button to a waist at the top, and button up and down the whole length of the sides also, so as to be taken off easily.

A farina kettle (which is a double pail, the outer one to hold water, the inner one for cooking,) is an important piece of kitchen furniture, as you can then boil custards, puddings, oatmeal, &c., without risk of burning. The large ones which hold most water are best; in those which have a closely fitting water-boiler there is danger of the drying away of the water before the dish is cooked.

Dont fry your beefsteak, but if you like gravy with it, broil it, after pounding, in an empty, hot spider; turn it over many times, and when sufficiently done, take it up on a platter. All the juice of the meat will be left in the spider. Add a little hot water, and thicken with flour and water smoothed together, for the gravy. Steak is usually spoiled in one of three ways: 1. By not pounding it enough. 2. By not turning it often while cooking. 3. By crowding too much into the spider at once, so that it cooks unevenly.

The following method of making currant jelly, which we have practiced for more than twenty years, will be found to save trouble, and afford a good article. For straining the jelly two pieces of board, shaped to form handles on one end, and hinged together with leather at the opposite end, form a good squeezer, saving the hands from burning. Put the currants (with the stems on) in stone jars and cover them. No leaves must be put in, for they are bitter. Set the jars in warm, but not hot, water over the fire. When the water boils, and the currants are warm and somewhat sunk in the jars, strain through a linen or flannel bag. To every pint of juice allow one pound of loaf sugar. The sugar is not to be cooked at all. Put it in a clean milk pail. Put the juice into a brass or porcelain kettle; boil it about five minutes, (not longer;) pour it boiling hot upon the sugar, and stir till all the sugar is dissolved. Then put it in bowls, glasses or jelly moulds. Paste on white paper covers. It will be thick in a few days.

THE FARMER'S REGISTER.

THE LISTS presented below are, as usual, made up from the advertising columns of THE COUNTRY GENTLEMAN, during the year preceding date of publication (Nov. 1, 1876,) and thus include the leading names in each department—those also most likely to be able to supply orders :

BREEDERS OF IMPROVED STOCK.

AYRSHIRE CATTLE.

Abbott, J J C..... ... ...Montreal, Can
Averill, L F.....Pomfret Centre, Ct
Ball, A P..... .....Derby Line, Vt
Benson & Burpee,..... Philadelphia, Pa
Brown, J Carter.....East Greenwich, R I
Brown, Henry T,.....Providence, R I
Byrne, P.. .... St. Joseph, Pa
Cloud, T A... .. ....Kennett Square, Pa
Cochrane, M H.....Compton, Can
Community Farm,.....Oneida, N Y
Cooper, T S..... ...Coopersburg, Pa
Cragin, G D.... ....Rye, N Y
Crozier, William,.....Northport, N Y
Curtis, F D .. ..Charlton, N Y
Dimon, John, ...Putnam, Ct
Drew, L S ..... South Burlington, Vt
Fitch, Thos. ..... New-London, Ct
Freck N C... ..... Millersburg, Pa
Freeman, J W... ..... Troy, N Y
French, J W D.....North Andover, Mass
Gibb, John L.....Compton, Can
Gold, T S..... .. West Cornwall, Ct
Harrah, W O..... ..... Cadiz, O
Hinds, W A..... Oneida, N Y
Holden, J H..... Belleville, Can
Hough, S D..... Weatogue, Ct
Kay, W F..... ...Montreal, Can
Kendall Farm,..... ...Woburn, Mass
King, W S ....Minneapolis, Minn
Leonard, R W..... New-Castle, N Y
Magone, D., Jr.,.....Ogdensburg, N Y
Manners, D S..... Jersey City, N J
Merriam, Herbert, ...Weston, Mass
Miles, E T. ..... Fitchburgh, Mass
Morris, F ....Philadelphia, Pa
Motley, T L .. ..Groton, Mass
Parry, William, ...Cinnaminson, N J
Peckham, C H..... Providence, R I
Phelps, W W.....Weatogue, Ct
Reeve, C..... .....Minneapolis, Minn
Roarke, P. .. ..Troy, N Y
Robins J N.....Northport, N Y
Stephenson, J B.. ... New Rochelle, N Y
Stewart & Son, H L..Middle Haddam, Ct
Sturtevant Brothers, S. Framingham, Mass
Van Waganen, J.....Lawyersville, N Y
Wells, S M & D . ....Wethersfield, Ct
Whitney, N S ....Montreal, Can

DEVON CATTLE.

Brown, J Carter,..... East Greenwich, R I
Brown, C .....Springhill, Tenn
Buckingham, J.....Zanesville, O
Cole, Walter, ...Batavia, N Y
Dimon, John, ... Putnam, Ct
Howard, L R C..... .. Zanesville, O
Longenecker, J B.....Union Deposit, Pa
Peck, B F..... East Bethany, N Y
Rogers, D.... ..... North Cornwall, Ct

GUERNSEY CATTLE.

Despard, H.....New-Castle, N Y

HEREFORD CATTLE.

Clopper, F Y. ..... Greensburg, Pa
Stone, Fred. Wm.... .....Guelph, Can

HOLSTEIN OR DUTCH CATTLE.

Chenery, W L.....Belmont, Mass
Comer, J H..... ... Goshen, N Y
Hoffman, H C.....Horseheads, N Y
Houghton Farm, ...Putney, Vt
Miller, Gerritt S ..... Peterboro, N Y
Oneida Community,..... Oneida, N Y
Tilton, W S..... . Togus, Me
Whiting, T E. . ..... Concord, Mass

JERSEY OR ALDERNEY CATTLE.

Alexander, A J..... Spring Station, Ky
Allinson, J..... Yardville, N J
Beekman, A S.... .. South Branch, N J
Beekman, W V S.... ....Saugerties, N Y
Betts, S..... . .....Camden, N J
Benson & Burpee,. . ....Philadelphia, Pa
Border-Bowen, H..... Bristol, R I
Bordwell, C..... ....Bear Lake, Pa
Bowditch, E F..... Framingham, Mass
Brown, C..... Spring Hill, Tenn
Briggs, J B.... ....Russellville, Ky
Brown, J Carter,.....East Greenwich, R I
Brown, John F .. .... Lunenburgh, Mass
Camp, J F.....Apalachin, N Y
Churchman, F M..... ..Indianapolis, Ind
Clift, W .. ..Mystic Bridge, Ct
Cloud, T A.... ..... Kennett Square, Pa
Cochran, T A.... .... Baltimore, Md
Cooley, J G..... ....North Franklin, Ct
Crozier, William,..... Northport, N Y
Curran, H B.....Whitestown, N Y
Despard, H.....New-Castle N Y
Dinsmore, W B..... ...Staatsburgh, N Y
Edgerton, James,..... ... Barnesville, O
Farlee, G W. ..... Cresskill, N J
Fitch, Thomas,..... .. New-London, Ct
Freck, N C.. ....Millersburg, Pa
Goodman, R..... ..... Lenox, Mass
Griswold, E D..... .. Orwell, Vt
Hand, Thos. J. .. ..Sing Sing, N Y

Harris, Mrs. Ira..... Albany, N Y
Hayt, James A..... ..Patterson, N Y
Herr, A G..... ... ... St Matthews, Ky
Hoe, R M. ... . 31 Gold-St., N Y
Jackson, Geo .... Indianapolis Ind
Jenkins, J Stricker,..... .Baltimore, Md
Juliand, Jos..... .. .... Bainbridge, N Y
Kelsey, H C... ....Trenton, N J
Lincoln, W S .....Worcester, Mass
Mackie, J M.....Great Barrington, Mass
McCready, W R... ..... Saugatuck, Ct
McHenry, J Howard,... .. Pikesville, Md
Mead, H..... Golden's Bridge, N Y
Mills, Lyman A... .. ... Middlefield, Ct
Montgemery, W B.....Starkville, Miss
Morrell, R..... Manhasset, N Y
Motley, T L. .....Groton, Mass
Newell, Dr. A D....New-Brunswick, N J
Osgood, H B.....Whitinsville, Mass
Owen C H... . .....Buckland, Ct
Parke, H S..... .....Bay Side, N Y
Parmly, Dr. E..... ..... Oceanic, N J
Pennington, J C & D... .. Paterson, N J
Reeder, E . ... New-Hope, Pa
Reynolds, I W H..... Frankfort, Ky
Rieman, Joseph H.....Baltimore, Md
Rittenhouse, J., Sr.,..... Tippecanoe, Pa
Roberts, D G..... ..... Pittsfield, Mass
Robins J N. ..... Northport, N Y
Rutherford, W L & W. Waddington, N Y
Sargent, C S.. .. . .Brookline, Mass
Sharpless, Charles L.....Philadelphia, Pa
Sharpless, Samuel J.....Philadelphia, Pa
Shields, H L ... . Bennington, Vt
Skinner, W E ... .. Hamburgh, N J
Spofford, J L & G S..... ....New-York
Stephens, R H...St. Lamberts, P. Q., Can
Stockton, S W..... Princeton, N J
Taylor, W S. ..... Burlington, N J
Thorne, E.. .....Millbrook, N Y
Tilton, W S..... ..... Togus, Me
Underhill, A A.....Poughkeepsie, N Y
Waring, G E., Jr..... Newport, R I
Watrous, H.. ... 51 Ferry-St., New-York
Wing, John D .....Millbrook, N Y

Norfolk Red Polled Cattle.

Taber, G F..... . .. Patterson, N Y

Short-Horn Cattle.

Abbott, Joseph..... Bluff Point, N Y
Alexander, A J..... Spring Station, Ky
Allen, L F .. .. Buffalo, N Y
Alvord, C T.....Wilmington, Vt
Avery & Murphy,..... Port Huron, Mich
Ayres & McClintock,. .. Millersburg, Ky
Bailey & Goodspeed, ...Baldwin, Wis
Bartlett, S W..... East Windsor, Ct
Beattie, Simon,.....Whitevale, Can
Bedford, G M..... .. ....Paris, Ky
Bedford, E G.. ....Paris, Ky
Bellwood, John,.....Newcastle, Can
Benson & Burpee,..... Philadelphia, Pa
Bethune, J N..... ....Warrenton, Va
Bowman, A M.....Waynesboro, Va
Briggs, J B .....Russellville, Ky
Brown, George,..... ....Brantford, Can
Brown's Sons, James N.....Berlin, Ill
Brown, S S.....Galena, Ill
Brown, W... .....Guelph, Ont
Burgess, J W ....Lexington, Ky
Bussing, D S..... Minaville, N Y
Butts, G..... Manlius, N Y
Christie, D.. .... Paris, Ont., Can
Cochrane, M H.....Compton, Can
Cockrill, M S... ..... Nashville, Tenn
Coen, P A..... Washburn, Ill
Combs, L., Jr..... .. Lexington, Ky
Collard, J.. ..... Des Moines, Iowa
Conger, T H.....Haverstraw, N Y
Cooper, T S..... Coopersburg, Pa
Cornell, Ezra, Estate of,... ..Ithaca, N Y
Cowan, J G.....Oregon, Mo
Craig, J R .....Edmonton, Can
Curtis, N M .....Ogdensburg, N Y
Davidson, E L..... Lexington, Ky
Davis, J H.....Lexington, Ky
DeForest, J J .....Duanesburg, N Y
Dodge, William B... .....Waukegan, Ill
Dun, John G. ..... London, O
Dun, R G ..... London, O
Foskett, G L..... ..... Winsted, Ct
Gano, J A... ..... Centreville, Ky
Gibson, W H .. ..Litchfield, Minn
Gibson, R..... .... London, Can
Goff, B P.... ....Winchester, Ky
Goodell, D H..... .....Antrim, N H
Gray, C K..... East Montpelier, Vt
Griswold, A W.. ..... Morrisville, Vt
Groom & Son, B B.....Winchester, Ky
Handy, W.....Mt. Freedom, Ky
Hagerty, G J.....Hanover, O
Hall, James,..... .... Paris, Ky
Hampton, A H.....Winchester, Ky
Hausen, W H.... ....Franklin Grove, Ill
Harison, T L ... .Morley, N Y
Hayward, Stephen,....Cummington, Mass
Heacock, Seth, ...Kettleby, Can
Hills, C..... .... Delaware, O
Hunter, J & R.... ..... Alma, Can
Iles, Edward,..... .....Springfield, Ill
Jones, T C... ..... Delaware, O
Jenkins, J C..... Petersburgh, Ky
Juliand, J..... Bainbridge, N Y
Ketcham, Morris, ... Westport, Ct
King, Wm. S.. .....Minneapolis, Minn
Kinnaird, J G..... ...Chilesburg, Ky
Kissinger, J H... .. ..Clarksville, Mo
Latimer, J S .... Abingdon, Ill
Lansing, C M.....Niagara, Ont., Can
Lowder, Charles,..... Plainfield, Ind
Lowry, W.... .... Pine Grove, Ky
Markham, W G..... Avon, N Y
Mason, V W..... Canastota, N Y
Matthews, Claude,..... Clinton, Ind
Maxon, G G .....Schenectady, N Y
McKeen, T L..... .....Easton, Pa
Meredith & Son, S....Cambridge City, Ind
Miller, George,.....Markham, Can
Miller, John,..... Brougham, Can
Miller, Robert,..... .. ....Pickering Can
Milne, Robert,.....Lockport Ill
Mix, J. ..... Kankakee, Ill
Murray, George,..... Racine, Wis
Neely, W J... ..... Ottawa, Ill
Otley, R.....Kewanee Ill

Page, John R..... ..... Sennet, N Y
Parsons, C., Jr..... Conway, Mass
Pickrell, J H.. .. .... Harristown, Ill
Pipe, J.... .... Guelph, Ont., Can
Pogue, R E..... Helena Station, Ky
Pond, N G.. .... Milford Ct
Porter & Son, J D ....Alexis, Ill
Prewitt, J W..... .. Winchester, Ky
Prewitt, R H. ... .Pine Grove, Ky
Redmon, C•T & S B..... Winchester, Ky
Reid, W B.....West Chester, Pa
Richardson, W H..... Lexington, Ky
Russell, J.....Richmond Hill, Ont., Can
Sanborn, J P..... Port Huron, Mich
Schnebly, L R..... Fairview, Md
Scott & Co., Joseph, ... Paris, Ky
Sherman, H B..... .. Burnett, Wis
Skinner, W E .. ..Hamburgh, N J
Smith, B W.... . ..... Lexington, Ky
Snell, John's Sons,.....Edmonton, Can
Spears & Son, J H... ..... Tallula, Ill
Sprague, G.....Des Moines, Iowa
Stewart, William,.....Franklin Grove, Ill
Stone, R M..... Marcellus, N Y
Stone, F W . . .. Guelph, Can
Streator, S R..... ....East Cleveland, O
Stuyvesant, J R.....Poughkeepsie, N Y
Sudduth, W L .... Winchester, Ky
Talcott & Sons, J ..... Rome, N Y
Talbott, Thomas E..... . .Dalhoff, Mo
Taylor, John B..... ...London, Can
Terrill, M W..... ... ...Middlefield Ct
Thomson, J S... .... Whitby, Ont., Can
Thomson, H.....St. Mary's, Can
Thomson, H P.... Thomson's Station, Ky
Thornton, J C.... .. .. Avonia, Pa
Towne, L W..... .. Hannibal, Mo
Upshur, C L..... ... Chuckatuck, Va
Van Meter, B F & A..... Winchester, Ky
Van Meter, I C.... . . Lexington, Ky
Van Meter, W C.. .. Winchester, Ky
Wadsworth, Charles F.. ...Geneseo, N Y
Walker, W E..... ... Schenectady, N Y
Warfield, William,. ..... Lexington, Ky
Warnock, W .....Cynthiana, Ky
Wentworth, John,.... ..... Summit, Ill
Whitman, A.....No. Leominster, Mass
Wood, Charles, ...Baden, Mo

Horses.

Alexander, A J ..... Spring Station, Ky
Backman, Charles, ...Goshen, N Y
Baker & Harrigan, Comstock's Landing, N Y
Baird, D.... ... Springfield Centre, N Y
Battell, R..... .....Norfolk, Ct
Beattie, S..... ..... Toronto, Can
Beekman, A S.... .. South Branch, N J
Brown, C..... Spring Hill, Tenn
Brown, J Carter,.....East Greenwich, R I
Cameron, R W ....New-York
Clark, Leander,..... ..Newburgh, N Y
Cochrane, M H .....Compton, Can
Cockrill, B F .. . . Nashville, Tenn
Crozier, William,..... Northport, N Y
Dun, J G. ....London, O
Fitch, Thomas,..... .. New-London, Ct
Fullington & Co., James, *Percherons*, Irwin Station, O
Goe, J S..... ..... Brownsville, Pa
Gibb, J L..... Compton, P. Q, Can
Gibson, T.....Spring Hill, Tenn
Griswold, A W.. ..... Morrisville, Vt
Hall & Taylor,..... ....Paris, Ky
Hardin, A W .....Worthington, Ky
Harison, T L ... . Morley, N Y
Helm, H T..... .. ... Lake Forest, Ill
Herr, A G.....St Matthews, Ky
Herr, L... ..... Lexington, Ky
Hitchcock, G C..... New Preston, Ct
Howard, L R C..... .. Zanesville, O
Jewett, G M ... .Zanesville, O
Juliand, Jos..... .. ....Bainbridge, N Y
Johnson, J P..... Spring Hill, Tenn
Kay, W F..... ....Montreal, Can
Kellogg, P C.. ..110 John-St., New-York
McKeen & Hulick,.... ... ...Easton, Pa
Mali, H W T.....Stockbridge, Mass
Mason, F A . ..... Putnam, O
Meikle, W..... .. Indiana, Pa
Moore, John,...Comstock's Landing, N Y
Newton, J M. .. ..Albany, N Y
Norris, F D. .....Brooklyn, N Y
Osborne, W F.....Ansonia, Ct
Parker, J J., *Percheron*, West Chester, Pa
Peck, W H..... .....Hartford, Ct
Penistan, R..... .. Lexington, Ky
Pryor, J B..... Holmdel, N J
Reynolds, I W H..... Frankfort, Ky
Russell, H S ....Milton, Mass
Sherman, H B... ..... Burnett, Wis
Shields, H L..... ..... Bennington, Vt
Stevens, George C.....Milwaukee, Wis
Stone, F W. ..... Guelph, Can
Swigert, D.... ..... Spring Station, Ky
Thorne, Edwin,.....Millbrook, N Y
Woodnutt, H C..... Flushing, L I., N Y
Withers, W T..... ....Lexington, Ky

Shetland Ponies.

Alexander, A J..... Spring Station, Ky
Swigert, D..... ... Spring Station, Ky

Cotswold Sheep.

Abbott, J J C..... ... ...Montreal, Can
Barbee, W H... .... Georgetown, Ky
Bedford, G M..... .. ...Paris, Ky
Birrell & Johnston,..Greenwood, Ont., Can
Briggs, J B.....Russellville, Ky
Brown, W... .....Guelph, Ont
Burroughs, H K..... Roxbury, N Y
Community Farm,.....Oneida, N Y
Cooper, T S..... ...Coopersburg, Pa
Craig, J R .....Edmonton, Can
Cragin, G W... .... Rye, N Y
Crozier, William,..... Northport, N Y
Deuel, S T..... Little Rest, N Y
Garne, R..... Aldsworth, England
Gibb, John L..... ...Compton, Can
Giles, J.. .... Putnam, Ct
Harris, Joseph,... .....Rochester, N Y
Hills, C..... ... Delaware, O
Ingersoll, George, ... Charleston, N Y
Kenney, W M.....Houston Station, Ky
King, W S ....Minneapolis, Minn
Lane, Wm... ..... Northleach, England
Marsh, R..... Richmond Hill, Ont., Can

Martin, J R..... ...Cayuga, Ont., Can
Mattocks. C P..... ... . Portland, Me
Maxon, J J..... ....Gallipolis. O
Miller. George,..... Markham, Ont., Can
Miller, W M .... Brougham, Ont., Can
Morris, Francis,.. .. . ..Philadelphia, Pa
Robins, J N. ..... Northport, N Y
Ruggles, C..... Bronson, Mich
Russell, J..... Richmond Hill, Ont., Can
Sayre & Son, Cooper, .Oak's Corners, N Y
Sedgwick, H.. . ....Cornwall Hollow, Ct
Sherman, H B.. .... Burnett, Wis
Smith, W C....New Hamburgh, Ont., Can
Snell, John's Sons,.... .. Edmonton, Can
Stone, Fred. Wm.... .. ....Guelph, Can
Swanwick, R. ..... Cirencester. England
Taylor, C S.. ..... Burlington. N J
Terrill, M W..... Middlefield, Ct
Thornton, J C..... Avonia, Pa
Van Waganen, J.....Lawyersville, N Y
Walker, J. ..... Northleach, England
Ward, C K..... .... LeRoy, N Y
Wilder, J B ..... Louisville, Ky
Wing, J D.....Millbrook. N Y
Woods, Dr. J R..... Ivy Depot, Va

Leicester Sheep.

Baldwnn, S.. ..... Waterbury, Ct
Benson & Burpee,..... Philadelphia, Pa
Douglas, W . ... Seneca, Ont., Can
Drevar, Dr. A. ..... Annapolis, Md
Ingersoll, George,.....Charleston, N Y
Hawley. J N..... .. ... Hawleyville, Ct
Magone, D., Jr.,.....Ogdensburg, N Y
Mattocks, C P.. .. .. Portland, Me
Meredith & Son, S....Cambridge City, Ind
Rutherford, W L & W. Waddington, N Y
Snell, John's Sons,..... Edmonton, Can
Thornton, J C .... Avonia, Pa

Lincoln Sheep.

Gibson, R..... .... London, Can
King, W S .....Minneapolis, Minn
Le Clair, Peter,. ... .Winooski, Vt
Rutherford, W L & W..Waddington, N Y

Merino Sheep.

Bacheldor, J M..... ..... Pownal. Vt
Brunson & Mariner,...East Bethany, N Y
Chamberlain, Wm. L.....Red Hook, N Y
Cole, Walter,.....Batavia, N Y
Cowles, C P.....Syracuse, N Y
Earll, J H..... Skaneateles, N Y
Gibbs, M F..... Livonia, N Y
Goe. J S. .... Brownsville, Pa
Joslin, J O .....Tiashoke, N Y

Shropshire-Down Sheep.

Cochrane, M H.....Compton, Can
Conger. T H .....Haverstraw, N Y
Meredith & Son, S... Cambridge City. Ind
Woods, Dr. J R ... .Ivy Depot, Va

Hampshire-Down Sheep.

Smith, C T... .....St. James, N Y
Carmalt, F..... ...Friendsville, Pa

South-Down Sheep.

Alexander, A J .....Spring Station, Ky
Allinson. J.... .....Yardville, N J
Benson & Burpee, ...Philadelphia, Pa
Cosgrove, P .... Madison. N J
Dun, John G. . ..... London, O
Gibson, R.. .... London, Can
Gray. C K..... East Montpelier, Vt
Gilman, N G ....Exeter, N H
Harison. T L..... Morley, N Y
Hasbrouck, J..... New-Paltz, N Y
Hulse, B. ... . Allentown, N J
Jones, T C... .... Delaware, O
Marsh, R..... Richmond Hill, Ont., Can
Morris, Francis,.....Philadelphia, Pa
Perrin, L D..... .....Perry Centre, N Y
Pettit, C.. .....Salem. N J
Reeder. E.... ..... New-Hope, Pa
Sappington, B F.. ..... Rock Hall. Md
Sharpless Samuel J.....Philadelphia, Pa
Speere, W W .....Prospectville, Pa
Stone, Fred. Wm..... ....Guelph, Can
Thornton. J C.... ..... Avonia, Pa
Wentworth, John D..... Chicago. Ill
Wing, John D..... ...Millbrook, N Y
Wood. Thomas,.. ..... Doe Run, Pa
Woods, H..... ..... Merton, England

Oxford-Down Sheep.

Kelsey, H C..... Newton, N J

Berkshire Swine.

Abbott, J..... Bluff Point, N Y
Abbott, J J C..... .....Montreal, Can
Allinson, J.....Yardville, N Y
Ball. A P..... .....Derby Line, Vt
Balderston. E. ..... Morrisville, Pa
Barbee, G L.... ..... Georgetown, Ky
Barbee, W H..... Georgetown, Ky
Beebe. O..... Hamilton, N Y
Beekman, A S..... ...South Branch, N J
Benson & Burpee,..... Philadelphia, Pa
Birrell & Johnston, Greenwood. Ont., Can
Bordwell, C..... ....Bear Lake, Pa
Bowen, E A..... Woodstock, Ct
Bowman. A M..... ....Waynesboro, Va
Brown, J Carter.....East Greenwich, R I
Brown, W..... .. Guelph, Ont., Can
Brugler, J M..... Hope, N J
Burroughs, H K..... Roxbury, N Y
Campbell. A G..... St. Hilaire, Can
Card, J B.... .... Sylvania, Pa
Clarke, W..... Schenectady, N Y
Cochrane, M H.....Compton, Can
Conelly, J L..... Harristown, Ill
Cooper, T S..... Coopersburg, Pa
Craig, J R .....Edmonton, Can
Crozier, William,..... Northport, N Y
Crutcher, T G .. . . Shelbyville. Ky
Curtis, F D... .....Charlton, N Y
Davison. J..... Morton, Pa
Deuel, S T..... .Little Rest, N Y
Dunbar, V A..... ... Bull Creek Va
Ely, L D ..... Rochester, N Y
Ewing. J H..... ...Villa Nova, Pa
Freeman. J W... ..... Troy, N Y
Fulford, A M..... Bel Air, Md
Gibb, J L.. ... .Compton, Can
Harrah, W O..... ..... Cadiz. O
Hasbrouck, I H..... ...Modena, N Y
Hills. C.....Delaware, O

Herr, A G..... ...St. Matthew's, Ky
Hoe. R M..... .... .. Mott Haven, N Y
Hoffman, E L..... Mill Creek. West Va
Jackson, Geo ..... Indianapolis Ind
Johnston, B H..... Alexandria, Va
Jones H B..... Dexter, Mich
Jones, T C... ..... Delaware, O
Juliand, J... ....Bainbridge, N Y
Kay, W F..... ...Montreal, Can
Kelsey, H C ..... Newton, N J
King, W S . ...Minneapolis, Minn
Kirk Bros..... ... Ellsworth, O
Lehman, H F ... .Hagerstown, Md
Lloyd, J E.... .... Baltimore, Md
Longenecker, J B.....Union Deposit, Pa
Martin, J R..... . ...Cayuga, Ont., Can
Mattocks, C P.. .. .. Portland, Me
McNish. W H.... ... ...Lyn, Ont., Can
Mead, H.....Golden's Bridge, N Y
Miller, W M.. .....Brougham, Ont., Can
Moore, C B..... ..... Christiana, Pa
Moore, H..... .... Golden's Bridge, N Y
Morris, Francis,..... Philadelphia, Pa
Moseley & Stoddard,. .....Poultney. Vt
Motley, T L... .....Groton. Mass
Mott, Thomas,.... Port Washington, N Y
Newton. M .....Henrietta, N Y
Norton, W C..... . Aldenville, Pa
Peck, B F..... East Bethany, N Y
Peters, Charles,..... Richmond, Va
Pickrell, J H..... .... .. Harristown, Ill
Pond, N G..... ... Milford, Ct
Rathbun. E J..... .....Otego, N Y
Roach. John,..... .....Toronto, Can
Robins. J N..... Northport, N Y
Schnebly, M N.....Fairview, Md
Sedgwick, H.... .....West Cornwall, Ct
Shepard. E..... West Cornwall, Ct
Sherman, H B..... .... Burnett, Wis
Snell. John's Sons,.....Edmonton. Can
Sprague, G.....Des Moines, Iowa
Stone, F W . . .. Guelph, Can
Stuyvesant. J R.....Poughkeepsie, N Y
Swanwick, R. .....Cirencester, England
Talcott, Jona.,..... Rome, N Y
Taylor, C S..... Burlington, N J
Terrill, M W..... ...Middlefield Ct
Thorne, Edwin,.....Millbrook. N Y
Thornton, J C..... . Avonia, Pa
Tilton, W S.... .. ..Augusta, Me
Underhill, A A.....Poughkeepsie. N Y
Upshur, C L. .... Chuckatuck, Va
Van Waganen, J.....Lawyersville, N Y
Walling, A J. .....New-Ohio, N Y
Waterhouse, J P..... Bevis, O
Woods, J R..... ..... Ivy Depot, Va

Cheshire Swine.

Adams. S.....Oneida Castle. N Y
Bacheldor, J M..... Pownal. Vt
Davis, E W .....Oneida Castle, N Y
DeForest, J J ..... Duanesburgh, N Y
Green, D..... ...Bellevilie, N Y

Chester County Swine.

Benson & Burpee,. . ....Philadelphia, Pa
Cloud & Sons, James,..Kennett Square, Pa
Cloud, T A..... ....Kennett Square, Pa
Curwen, G F..... Villa Nova, Pa
Earll, J H... ..... Skaneateles, N Y
Edgerton, James,..... .... Barnesville, O
Ewing, J Hunter,..... ... Villa Nova, Pa
Wood & Son, T. . ..... Doe Run, Pa
Worth, F..... Marshallton, Pa
Young & Co., James, Jr.. Marshallton, Pa
Young, G P.....Grafton, Mass

Essex Swine.

Birchard, L T..... Birchardville, Pa
Bowditch, E F..... Framingham, Mass
Chase, L A.....Boston. Mass
Cobb, J M..... ... Beloit, Wis
Farlee, G W. ..... Cresskill, N J
Giles, J S..... Apalachin. N Y
Gutchess, O.....Port Byron. N Y
Harris, Joseph,.....Rochester, N Y
Hulse, B..... ..... Allentown, N J
McCready, W R..... Saugatuck, Ct
Sherman, F..... Vienna, Va
Sturge Brothers, ... Spencerport. N Y
Waring, G E., Jr..... Newport, R I
Watrous, H.. ... 51 Ferry-St., New-York
Wodell, Walter, ... Millbrook, N Y

Jersey Red Swine.

Pettit, C.. .....Salem, N J

Poland China Swine.

Beekman, A S.... .. South Branch, N J
Benson & Burpee,..... Philadelphia, Pa
Camp, J F.....Apalachin, N Y
Gray, C K..... East Montpelier, Vt
Johnson, G B..... Brewerton, N Y
Lippincott, James,.....Mt. Holly, N J
Magie, J J..... .....Oxford, O
Maxon, J J..... .....Gallipolis, O
Morse, W C.....Painted Post, N Y
Pettit, F..... Salem, N J
Ruggles, C.....Bronson, Mich
Talcott & Son, J.....Rome, N Y

Suffolk Swine.

Benson & Burpee,..... Philadelphia, Pa
Harison, T L..... Morley, N Y
Hyde, Alexander,.....Lee, Mass
Jones, H B.....Dexter, Mich
Magone, D., Jr.,.....Ogdensburgh, N Y
Wentworth, John,.... ..... Chicago, Ill
Wheeler, L P..... .. Quincy, Ill

Yorkshire Swine.

Chandler, J K .....Boscawen, N H
Cole, W H..... Hunterdon, N J
Cooper. T S..... .. Coopersburg. Pa
Giles. J S .. ..Apalachin, N Y
Hoe. R M..... .....Morrisania, N Y
Maxon, J J. .... Gallipolis. O
Mead, H .....Golden's Bridge, N Y
Merriam. H. .....Weston, Mass
Moore, C B.....Christiana, Pa
Morris, F..... Philadelphia. Pa
Motley, T L .. ..Groton, Mass
Saltonstall, Henry,..... ....Boston, Mass
Stone, F W. ... . Guelph, Can

Poultry Fanciers.

Acton, C B.....Salem, N J
Barney, E H..... Milford, N Y
Bates, C... .....Richfield Springs, N Y
Beebe, J M.. ... . Cassadaga, N Y

Beekman, A S..... ...South Branch, N J
Benson & Burpee,. .....Philadelphia. Pa
Bicknell. J Y.....Westmoreland, N Y
Bliss. O S .... Georgia, Vt
Bordwell, C..... ... Bear Lake, Pa
Campbell. A G..... St. Hilaire. Can
Carson. A H..... Newport, R I
Chaffee. J D..... Morris. N Y
Chamberlain, C W..... Arlington, Mass
Charles, G H., Jr..... ....Albany, N Y
Clift. Wm.. ... .Mystic Bridge. Ct
Conelly, J L..... Harristown, Ill
Cooper, T S..... Coopersburg, Pa
Cowles, C P.....Syracuse, N Y
Cox, E C. .. .. Kennett Square. Pa
Cross, F S.. ..... Batavia, N Y
Crozier, William,..... Northport, N Y
Curtis, C F..... Jamaica Plain, Mass
Dayton, G..... ... .Rutherford, N J
DeForest, J J.....Duanesburgh, N Y
Dickie, Dr. A M.....Doylestown, Pa
Durnall, E J.....Street Road Station, Pa
Earll, J H. ..... Skaneateles, N Y
Elben, C B .... Pittsburgh, Pa
Ewing, J H... .....Villa Nova, Pa
Farlee, G W..... Cresskill, N J
Fassett, E.....Forkstown. Pa
Fowler, W W..... West Haven, Conn
Freck, N C.. .....Millersburgh, Pa
Gibson, R..... London, Can
Giles, J S... .....Apalachin, N Y
Gregg. O..... . ..Washingtonville, N Y
Haines. R H .. . .Malden, N Y
Harvey, B P. .. ... Raynham, Mass
Hasbrouck, B & V.... South Orange, N J
Hawkins, C F.. .. .. Goshen, N Y
Hay, G R... .....West Laurens, N Y
Hayt. James A ..... . Patterson, N Y
Hayward, C E L.. .... Peterboro, N H
Hills, W R. . . . . Albany, N Y
Hoffman, E L..... Mill Creek. West Va
Hoof. L..... ..... Alexander, Va
Holcombe, P Q. .... Reaville, N J
Horne, W... .... Janesville, Wis
Hough. S D..... Weatogue, Ct
Hulse, B..... .. .. Allentown, N J
Hults, J B.... .... Girard. O
Humphrey, A B... ....Weavertown. N Y
Hunt. W..... Philadelphia. Pa
Ives, John S..... ..... Salem. Mass
Jackson, G.....Indianapolis, Ind
Jacobs, J N.... ....Holland Patent, N Y
Josselyn, G.....Fredonia, N Y
Judd, J W..... Orange. N J
Juliand, Jos..... .... Bainbridge, N Y
Kelsey, H C.... .. ..Newton, N J
Koiner, S..... .....Waynesboro, Va
Larkin, A B..... Central Bridge, N Y
Lloyd, J E..... Baltimore, Md
Long. J C., Jr... .. ....Philadelphia, Pa
Magee, S..... .. ....Fowler's, West Va
Magone, D., Jr.,..... Ogdensburgh, N Y
Masters. F M.... .. .. Everett, Pa
Mattocks. C P..... Portland. Me
Maxon, J J..... ... Gallipolis. O
McKeen, T L. ....Easton. Pa
McKinstry, A W..... Chicopee. Mass
Miller, A A..... Oakdale Station, Pa
Morrell, R..... Manhasset, N Y
Mullin A F.....Mt. Holly Springs. Pa
Newell, Dr. A D... New-Brunswick, N J
Nicholls, B H. ....Lockport, N Y
Noxon, D C ..... Roxbury. N J
Osborne, W F..... Ansonia, Ct
Osgoodby, J H..... Pittsford. N Y
Parker, J J..... .... West Chester, Pa
Parker, S J..... ..... West Chester, Pa
Pennington, J C & D... ...Paterson, N J
Perry, A..... Monroe. N Y
Phillips, J H..... Coventry, N Y
Plumb, J N..... Islip N Y
Potter Brothers,....Onondaga Valley, N Y
Rathbun, E J ....Otego. N Y
Rhodes, H A.....East Greenwich, R I
Rice, J L..... ..Rensselaerville, N Y
Roof. A.. ..... Starkville, N Y
Rutherford, W L & W. Waddington, N Y
Shaffer, J F .... Macungie, Pa
Sharpless. C L.....Philadelphia. Pa
Sherman, H B..... Burnett, Wis
Stuyvesant, J R.....Poughkeepsie, N Y
Symonds. J H..... Boston, Mass
Taylor, C S..... ..... Burlington, N J
Thornton, J C..... Avonia, Pa
Treadwell, C W.....Exeter, N H
Tupper, C F... ..... Canton, N Y
Underhill, H H.....Croton Landing, N Y
Valentine, C D ..... Fordham, N Y
Vanderveer, G.. .....Port Jackson, N Y
Van Winkle, I..... .... Greenville, N J
Wardwell, T O..... North Andover, Mass
Warner, G H..... New-York Mills, N Y
Warner, John C....Washingtonville, N Y
Webster, C F..... .. Girard. Pa
Weld. M C..... .....Closter, N J
Welles. J C... .... Athens, Pa
Wentworth. John,..... Chicago Ill
Wheaton Brothers,..... ... Zoar, Mass
Whitman, E..... ... Fitchburgh. Mass
Whitney. Amos, ... Hartford, Ct
Wood, B L..... Doe Run. Pa
Young, G P .... Grafton. Mass
Young, J., Jr.,... . .... Marshallton, Pa

BEES.

Root, L C..... St. Johnsville, N Y

ANGORA GOATS.

Goe, J S..... Brownsville, Pa

FISH AND SPAWN.

Clift, W..... ...Mystic Bridge, Ct
Field, W R..... .. Richland. N Y

FERRETS.

Johnson, J..... . ...Hartland, Wis
Osgoodby, J H.... ....Pittsford. N Y

DOGS.

Burns, Wm.....Montreal, Can
Campbell. A G...St. Hilaire, Quebec, Can
Clark, T R..... ..... New-York
Crozier, William,..... Northport. N Y
Dart, A G..... .... Norwich, Ct
Downey, J W ..... New-Market, Md
Hulse. Benj.. *Sheep Dogs*. Allentown. N J
Juliand. Joseph, ... Bainbridge, N Y
Lehman, H F ..... Hagerstown, Md

Lindsay, W ..... West Hamburgh, N Y
Long, J C... ... . Philadelphia, Pa
Mullin, A F.....Mt. Holly Springs. Pa
Taylor. W S..... .... Burlington, N J
Watrous, D W... .... New-York
White, B F.... .. ...Ashley Falls, Mass

RABBITS.

Carey, H.....So. Hadley Falls, Mass
Hoof, L. ... . Alexandria, Va

DEER.

Wilder, J B .... Louisville, Ky

HORTICULTURAL AND SEED REGISTER.

NURSERIES.

Adair, William,.. . ..... Detroit, Mich
Adams, J W... ..... Springfield. Mass
Allen, Edwin,.....New-Brunswick, N J
Atchelis, G .. .... West Chester, Pa
Atwood, Root & Co.,... ....Geneva, N Y
Baker, George,..... .. Toledo, O
Baird. D.... ..... Manalapan, N J
Balderston, George,..... ....Colora, Md
Battles, A..... Girard, Pa
Benton, D C.. ....Quincy, Ill
Biddle, F C..... ... Chaddsford, Pa
Buist, R .....Darby Road, Philadelphia
Burrow, Wood & Co..... Fishkill, N Y
Cates & Grennell,. ..... Navarino, N Y
Chase, & Co., R G.....Geneva, N Y
Dann, C H ... . Warsaw. N Y
Douglas & Sons,... .....Waukegan Ill
Draper, James, ...Worcester, Mass
Edgerton, J .... Barnesville, O
Edwards. S., Jr.,..... LaMoille. Ill
Ellwanger & Barry,.... ..Rochester. N Y
Ferris, W L., Jr. & Co., Poughkeepsie, N Y
Frost & Co..... ... Rochester, N Y
Foster. Suel,..... .....Muscatine, Iowa
Hance & Son, A.... .....Red Bank, N J
Hanford. R G..... .. Columbus, O
Harrington, E W..... Palmyra, N Y
Heikes. W F.. ....Dayton. O
Hooker & Bro., H E .....Rochester. N Y
Hoopes Bro. & Thomas, West Chester. Pa
Hovey & Co... ..... Boston. Mass
Hoyt & Sons, S..... ..New-Caanan. Ct
Jones & Palmer,.....Rochester. N Y
Jenkins. J ... . Winona. O
Little. W S... ....Rochester, N Y
Maxwell & Bros., T C..... Geneva, N Y
McKelvie. W G.....Geneva, N Y
Meehan. Thomas,..... Germantown. Pa
Moody & Sons, E..... Lockport. N Y
Moon, W H..... Morrisville, Pa
Parry, William, ... Cinnaminson, N J
Parsons & Co., R B..... ..Flushing, N Y
Pearson, W L..... ...Schenectady, N Y
Peirson, E C.....Waterloo, N Y
Peters. C P ....Concordville. Pa
Peters, Randolph,.....Wilmington, Del
Phœnix, F K .... Bloomington. Ill
Pullen. T J.....Hightstown, N J
Rakestraw & Pyle, ...Willowdale, Pa
Richardson & Kelsey,.....Geneva, N Y
Richardson & Nicholas,..... Geneva, N Y
Riehl. E A. .. .. Alton, Ill
Roberts, Josiah A..... ... Paoli. Pa
Root, James A..... Skaneateles. N Y
Saul. John..... ...Washington, D C
Seeley, I S. ..... Geneva. N Y
Sleeper, W M..... Oxford, Ind
Simpson, J H. ... .Vincennes, Ind
Smith. W & T..... ....Geneva. N Y
Smith & Powell,... .....Syracuse. N Y
Storrs. Harrison & Co..... Painesville, O
Strong & Co., W C.....Brighton, Mass
Studley. E G. .... Claverack, N Y
Sylvester. E Ware,..... Lyons, N Y
Teas, E Y.... .. .. Richmond, Ind
Thompson, G W..... . Stelton, N J
Watson, B M..... Plymouth, Mass
Wier. D B.... .....Lacon. Ill
Will, W F..... Fayetteville, N Y

SMALL FRUITS AND GRAPES.

Allen, E E.....Northampton, Mass
Allen. S L..... . ....Cinnaminson. N J
Allis. S J... .... Erie. Pa
Anthony, J W... .. ..Smyrna. Del
Babcock, I H.....Lockport, N Y
Bateham. M B..... .. Painesville, O
Briggs, I W..... . West Macedon, N Y
Brown & Sons, D H., New-Brunswick, N J
Burgess, Edward,..... Poughkeepsie. N Y
Burgess, Thomas H.. .....Highland. N Y
Bush. Son & Meissner,..... Bushberg. Mo
Campbell, G W.. .. .. Delaware, O
Clark, B W... .. .. Lockport, N Y
Community Farm,.....Oneida, N Y
Collins. John S.....Moorestown. N J
Dingwall. John,. .... .Albany, N Y
Donaldson. J A. ..... St. Joseph, Mich
Donnelly & Co.,.....Rochester, N Y
Draper, James, ...Worcester, Mass
Durand, E W..... .....Newark, N J
Ellwanger & Barry,.....Rochester, N Y
Ferris, W L., Jr. & Co.,Poughkeepsie, N Y
Ford, Frank,. ....Ravenna, O
Haines, R H.....Malden, N Y
Hanford, R G..... ... Columbus, O
Harrington, E W..... . Palmyra, N Y
Hendricks, H.....:..... Kingston, N Y
Hoag, A L.....Hudson, N Y
Hoag & Clark,..... Lockport, N Y
Hubbard, T S..... Fredonia, N Y
Hunt, W M.....Waterloo, N Y
Miller. Amos,..... Carlisle, Pa
Moon, W H..... ....Morrisville, Pa
Parry, William,.. ..... Cinnaminson, N J
Parsons & Co., R B... .. Flushing. N Y
Patterson, J S..... .... Berlin Heights. O
Perry & Robinson,..... ...Syracuse, N Y
Potter & Co., E J.....Knowlesville, N Y
Purdy, A M . . .. Palmyra. N Y
Purdy & Hance,.....South Bend, Ind
Quinn, P T. ... . Newark, N J
Reisig & Hexamer,..... New-Castle. N Y
Ringueberg & Son, N S....Lockport, N Y
Roe, E P...Cornwall-on-the-Hudson, N Y
Smith. H H.. .... West Haven, Ct
Strong. W C..... . . ....Brighton, Mass

Sylvester, E W.....Lyons, N Y
Thayer, W J. .....Seneca Falls, N Y
Thompson, S E..... ... Vienna, Md
Thompson, G W.... New-Brunswick, N J
Trowbridge, F... .... Milford, Ct
Underhill, S W. ... Croton Landing, N Y
Wildey, D C ....Hudson, N Y
Williams, E & J C .....Montclair, N J
Wood, L L .....Vineland, N J
Worden, S. ..... Minetto, N Y

SEEDSMEN, FLORISTS, &c.

Acker, H E..... ..... Woodbridge, N J
Allen & Co., R H..... New-York
Balderston, George,..... Colora, Md
Barrett & Co., W E . ... Providence, R I
Benson & Burpee .. ... Philadelphia, Pa
Bliss & Sons, B K.....New-York
Bowditch, Wm. E.....Boston, Mass
Briggs & Bro. .....Rochester, N Y
Brill, Francis,. ... .Mattituck, N Y
Brown & Sons, D H..New-Brunswick, N J
Brown, W F... ....Oxford, O
Buist, R ...Darby Road, Philadelphia, Pa
Buist, R., Jr..... ....Philadelphia, Pa
Case, L B ..... Richmond, Ind
Crosman Bros..... Rochester, N Y
Detroit Seed Co..... .... Detroit, Mich
Dingee & Conard,.....West Grove, Pa
Dreer, Henry A.. .....Philadelphia, Pa
Ferry, D M & Co..... Detroit, Mich
Fleming, James,..... New-York
Foote, J A..... ... Terre Haute, Ind
Gregory, J J H..... Marblehead, Mass
Hance & Son, A.....Red Bank, N J
Hawkins, J V R .... Goshen, N Y
Hawley, R D ..... Hartford, Ct
Henderson & Co., Peter,.....New-York
Hendrick, J ... . Albany, N Y
Herendeen & Co..... Geneva, N Y
Hovey & Co.....Boston, Mass
Ives, John S.... .. .. Salem, Mass
Kern, Steber & Co.... ....St. Louis, Mo
Landreth & Son, David, Philadelphia, Pa
Long Brothers,..... ..Buffalo, N Y
Mahon & Co. .....Rochester, N Y
Moon & Son, Mahlon,.... Morrisville, Pa
Nelson & Co., D G.....Fort Wayne, Ind
Nordyke, C A ..... Richmond, Ind
Parsons & Co., R B .....Flushing, N Y
Payne, A ..... Scipioville, N Y
Plant Seed Co..... ....St. Louis, Mo
Price & Knickerbocker,.....Albany, N Y
Quinn, P T..... .....Newark, N J
Reeves, E A.. .... New-York
Rennie, W..... .....Toronto, Ont., Can
Root, J B..... ..... Rockford Ill
Root, J A..... ..... Skaneateles, N Y
Sanders, Carew, ...Colman, Mo
Sanders, Edgar,.. ..... Chicago, Ill
Schlegel, Everett & Co..... Boston, Mass
Smith, Edw.,..... .. ...Coila, N Y
Snook, L D..... .....Barrington, N Y
Spooner, W H. ..... Boston, Mass
Such, G... .....South Amboy, N J
Thorburn & Co., J M.....New-York
Teas, E Y .... Richmond, Ind
Tillinghast Brothers,..... Factoryville, Pa
Vick, James,.... ..... Rochester, N Y
Washburn & Co. .... Boston, Mass
Watson, B M..... Plymouth, Mass
Wells, S M & D..... .. Wethersfield, Ct

CRANBERRIES.

Trowbridge, F..... ...New-Haven, Ct

SEED GRAINS, &c.

Arnold, Charles,..... Paris, Can
Beattie, H C .. .. Bellona, N Y
Biddle, F C.. ..... Chaddsford, Pa
Beekman, A S..... South Branch, N J
Boardman, H M.....Rushville, N Y
Crofut & Co., E B.....Syracuse, N Y
Cowles, C P.... . .....Syracuse, N Y
Doak, M S.. .....Greenville, Tenn
Edgerton, James,.....Barnesville, O
Ely, L D ..... Rochester, N Y
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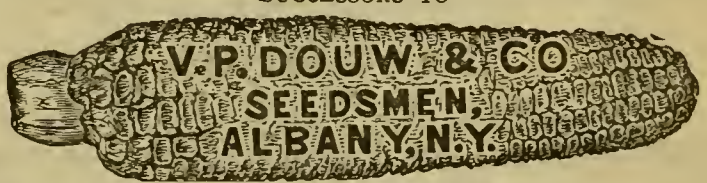

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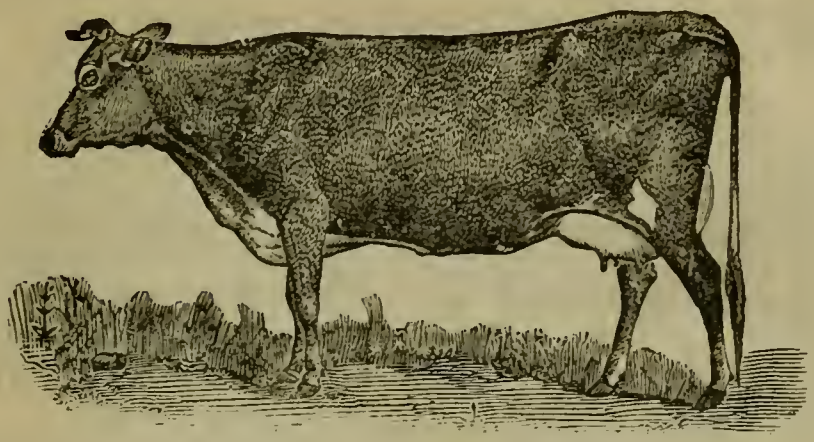

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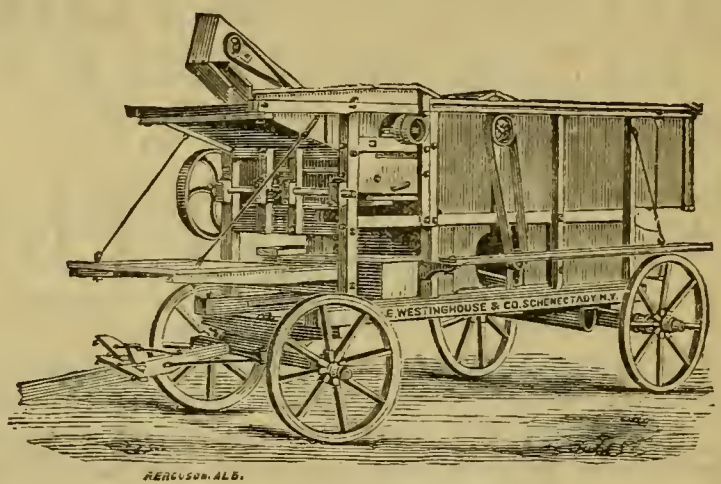

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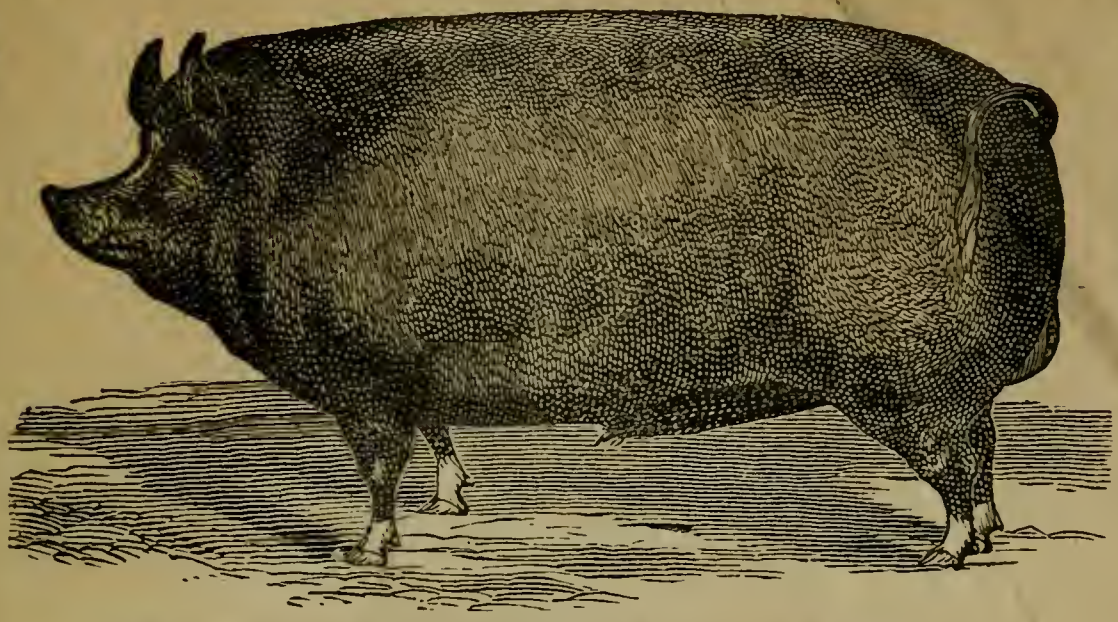

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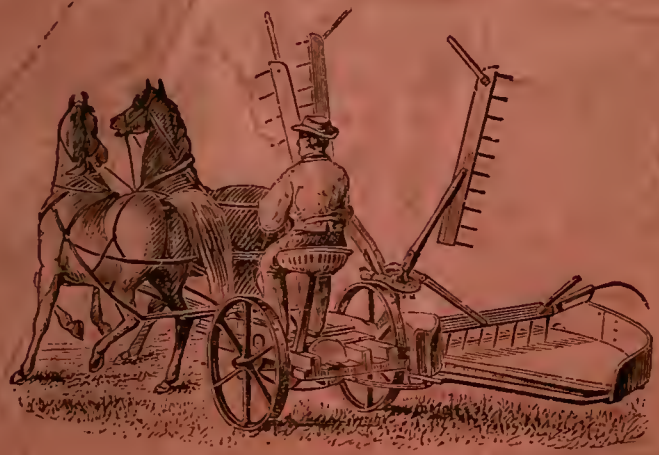

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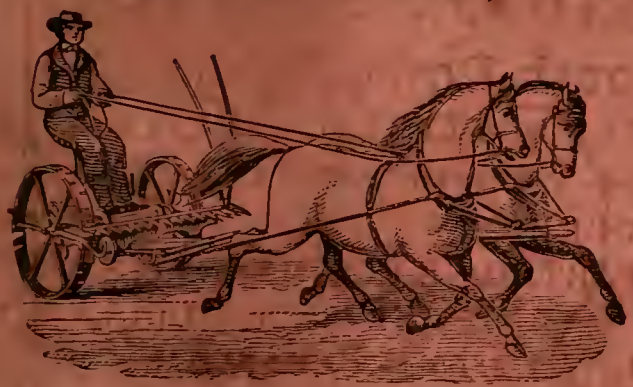

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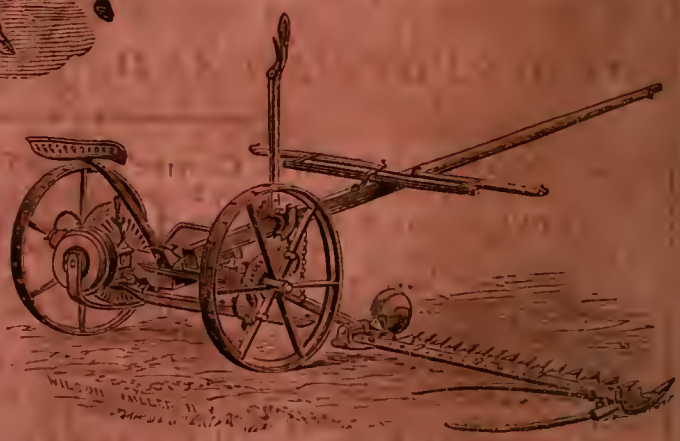

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